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OFFICE OF MANAGEMENT SERVICES  
DBF - BUDGET BRANCH  
CENTRAL FILES



OFFICE OF THE SECRETARY  
BUDGET ESTIMATES SECTION  
BUDGET AND FINANCE  
FILE COPY

VOLUME NO. 1

EXPLANATORY NOTES

FOR

DEPARTMENT OF AGRICULTURE

BUDGET ESTIMATES

U. S. D. A.  
National Agricultural Library  
Received

FISCAL YEAR

Procurement Section  
Current Serial Records

1940

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(Volume 1)

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3. The third part of the report is a discussion of the results of the study.

4. The fourth part of the report is a conclusion and a list of references.

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2. The second part of the paper describes the methodology used in the study and the data collection process.

3. The third part of the paper presents the results of the study and discusses the findings in detail.

4. The fourth part of the paper discusses the implications of the study and the conclusions drawn from the research.

5. The fifth part of the paper discusses the limitations of the study and the areas for future research.

6. The sixth part of the paper discusses the contributions of the study to the field of research.

7. The seventh part of the paper discusses the practical applications of the study and the recommendations for practice.

8. The eighth part of the paper discusses the overall findings of the study and the conclusions drawn from the research.

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### Project Statements

Following the custom of previous years, for the sake of simplicity and avoidance of confusion, "Project Statements" as shown in this book in general are limited to a breakdown of funds appropriated or allotted directly to the Department of Agriculture and do not generally include funds transferred from other Departments or establishments, although the latter are included in the Budget expenditure schedules under the items involved.

The Project Statements printed in the formal Budget and reprinted in the Subcommittee Print include, in addition to the direct funds, projects dealing with funds transferred from other Departments -- for example, funds received from such agencies as the Navy Department or the Veterans' Administration, for the inspection of meats by the Bureau of Animal Industry, or the inspection of food and drug samples by the Food and Drug Administration. Where it is desired to examine a project statement which includes such transferred funds, therefore, reference should be made to the Project Statements in the Budget or to the Subcommittee Print.



# United States Department of Agriculture

## 1940 Budget Estimates

Estimates for the Department of Agriculture in the 1940  
Budget Compared with Appropriations and Reappropriations for 1939,  
Showing Bureaus and Items under a Group Classification.

| Item   | Appropriation<br>1939 | Budget<br>Estimate,<br>1940 | Increase or<br>Decrease,<br>1940 |
|--|-----------------------|-----------------------------|----------------------------------|
| . Ordinary Activities (Bureaus are shown on<br>the basis of the 1940 Budget Estimates,<br>and 1939 appropriations have been ad-<br>justed where necessary to reflect<br>transfers in the Estimates): |                       |                             |                                  |
| Office of the Secretary.....   | \$870,825             | \$925,770                   | + \$54,945                       |
| Office of the Solicitor.....   | 232,480               | 232,480                     | - -                              |
| Office of Information.....   | 1,474,770             | 1,545,410                   | + 70,640                         |
| Library.....   | 105,420               | 109,220                     | + 3,800                          |
| Office of Experiment Stations.....   | 228,980               | 244,735                     | + 15,755                         |
| Special Research Fund.....   | 1,400,000             | 1,400,000                   | - -                              |
| Extension Service.....   | 892,254               | 965,416                     | + 73,162                         |
| Foreign Agricultural Service.....  | 295,000               | 545,000                     | + 250,000                        |
| Weather Bureau.....  | 4,987,870             | 6,746,570                   | + 1,758,700                      |
| Bureau of Animal Industry:   |                       |                             |                                  |
| Eradicating tuberculosis and Bang's<br>disease:  |                       |                             |                                  |
| Regular appropriation.....   | 5,403,000             | 9,800,000                   | + 4,397,000                      |
| Special reappropriation.....   | (a) 6,600,000         | 1,227,000                   | - 5,373,000                      |
| All other work of Bureau.....  | (b) 8,348,752         | 8,407,652                   | + 58,900                         |
| Bureau of Dairy Industry.....  | 717,405               | 751,405                     | + 34,000                         |
| Bureau of Plant Industry.....  | 5,110,337             | 5,120,344                   | + 10,007                         |
| Forest Service.....  | 14,310,400            | 15,031,285                  | + 720,885                        |
| Bureau of Agricultural Chemistry and<br>Engineering.....   | 1,424,169             | 1,443,169                   | + 19,000                         |
| Bureau of Entomology and Plant Quarantine.....   | 5,621,867             | 5,667,914                   | + 46,047                         |
| Bureau of Biological Survey.....   | (c) 2,123,340         | 2,338,691                   | + 215,351                        |
| Bureau of Agricultural Economics.....  | 891,000               | 928,000                     | + 37,000                         |
| Agricultural Marketing Service.....  | (d) 5,824,555         | 6,149,145                   | + 324,590                        |
| Bureau of Home Economics.....  | 305,085               | 305,085                     | - -                              |
| Commodity Exchange Administration.....   | 623,380               | 723,000                     | + 99,620                         |
| Food and Drug Administration.....  | 2,226,138             | 2,977,758                   | + 751,620                        |
| Soil Conservation Service.....   | 23,645,584            | 23,645,584                  | - -                              |
| Beltsville Research Center.....  | 85,000                | 90,000                      | + 5,000                          |
| Total, Ordinary Activities....   | 93,747,611            | 97,320,633                  | + 3,573,022                      |





| Item   | Appropriation<br>1939 | Budget<br>Estimate,<br>1940 | Increase or<br>Decrease,<br>1940 |
|--|-----------------------|-----------------------------|----------------------------------|
| <u>Special Items:</u>  |                       |                             |                                  |
| Cooperative Farm Forestry (Norris-Doxey Act<br>of May 18, 1937).....   | - -                   | \$600,000                   | + \$600,000                      |
| Special blister rust control program,<br>national forests.....   | - -                   | 500,000                     | + 500,000                        |
| Incipient and emergency outbreaks of<br>insect pests and plant diseases (Acts of<br>April 6, 1937, and May 9, 1938)..... | (e) \$700,000         | - -                         | - 700,000                        |
| Acquisition of lands for national<br>forests.....  | 3,000,000             | 2,000,000                   | - 1,000,000                      |
| Acquisition of land for Upper Mississippi<br>River Wildlife Refuge.....  | - -                   | 60,000                      | + 60,000                         |
| Private forestry cooperation.....  | 100,000               | 125,000                     | + 25,000                         |
| Flood control (transfer from War Dept.):   |                       |                             |                                  |
| Examinations and surveys.....  | (f) 3,000,000         | 3,000,000                   | - -                              |
| Improvement projects.....  | (f) 4,000,000         | - -                         | - 4,000,000                      |
| Water Facilities Act, Arid and Semiarid<br>Areas.....  | 500,000               | 500,000                     | - -                              |
| Construction of tobacco laboratory,<br>Oxford, N. C. ....  | 80,000                | - -                         | - 80,000                         |
| Mediterranean Fruit Fly Board.....   | (g) 10,000            | - -                         | - 10,000                         |
| First unit, extensible building for<br>Weather Bureau, Washington, D. C. ....  | - -                   | 250,000                     | + 250,000                        |
| Total, Special Items.....  | 11,390,000            | 7,035,000                   | - 4,355,000                      |
| <u>Receipt and Contributed Funds:</u>  |                       |                             |                                  |
| <u>Forest Service:</u>   |                       |                             |                                  |
| Acquisition of Land from National<br>Forest Receipts:  |                       |                             |                                  |
| Uinta and Wasatch National Forests.....  | 50,000                | 40,000                      | - 10,000                         |
| Cache National Forest.....   | - -                   | 6,000                       | + 6,000                          |
| San Bernardino and Cleveland National<br>Forests.....  | - -                   | 15,000                      | + 15,000                         |
| Nevada and Toiyabe National Forests....  | - -                   | 10,000                      | + 10,000                         |
| Payments to States and Territories.....  | 1,114,700             | 1,275,000                   | + 160,300                        |
| Payments to school funds, Arizona and<br>New Mexico.....   | 30,000                | 30,000                      | - -                              |
| Roads and trails for States.....   | 510,000               | 510,000                     | - -                              |
| Cooperative work (contributed funds).....  | 1,000,000             | 1,000,000                   | - -                              |
| <u>Bureau of Biological Survey:</u>  |                       |                             |                                  |
| Migratory bird conservation fund.....  | 750,000               | 750,000                     | - -                              |
| Payments to counties under Migratory<br>Bird Conservation Act.....   | 15,000                | 15,000                      | - -                              |
| <u>Food and Drug Administration:</u>   |                       |                             |                                  |
| Seafood inspection fees (trust account)..  | 5,235                 | 5,235                       | - -                              |
| <u>Farm Security Administration trust funds:</u>   |                       |                             |                                  |
| Payments in lieu of taxes and for<br>operation and maintenance of re-<br>settlement projects.....                        | 1,200,000             | 1,600,000                   | + 400,000                        |
| State Rural Rehabilitation Corporation<br>Funds.....   | 2,840,000             | 2,475,000                   | - 365,000                        |
| Miscellaneous contributed funds.....   | 116,900               | 106,400                     | - 10,500                         |
| Total, Receipt and Contributed Funds...  | 7,631,835             | 7,837,635                   | + 205,800                        |

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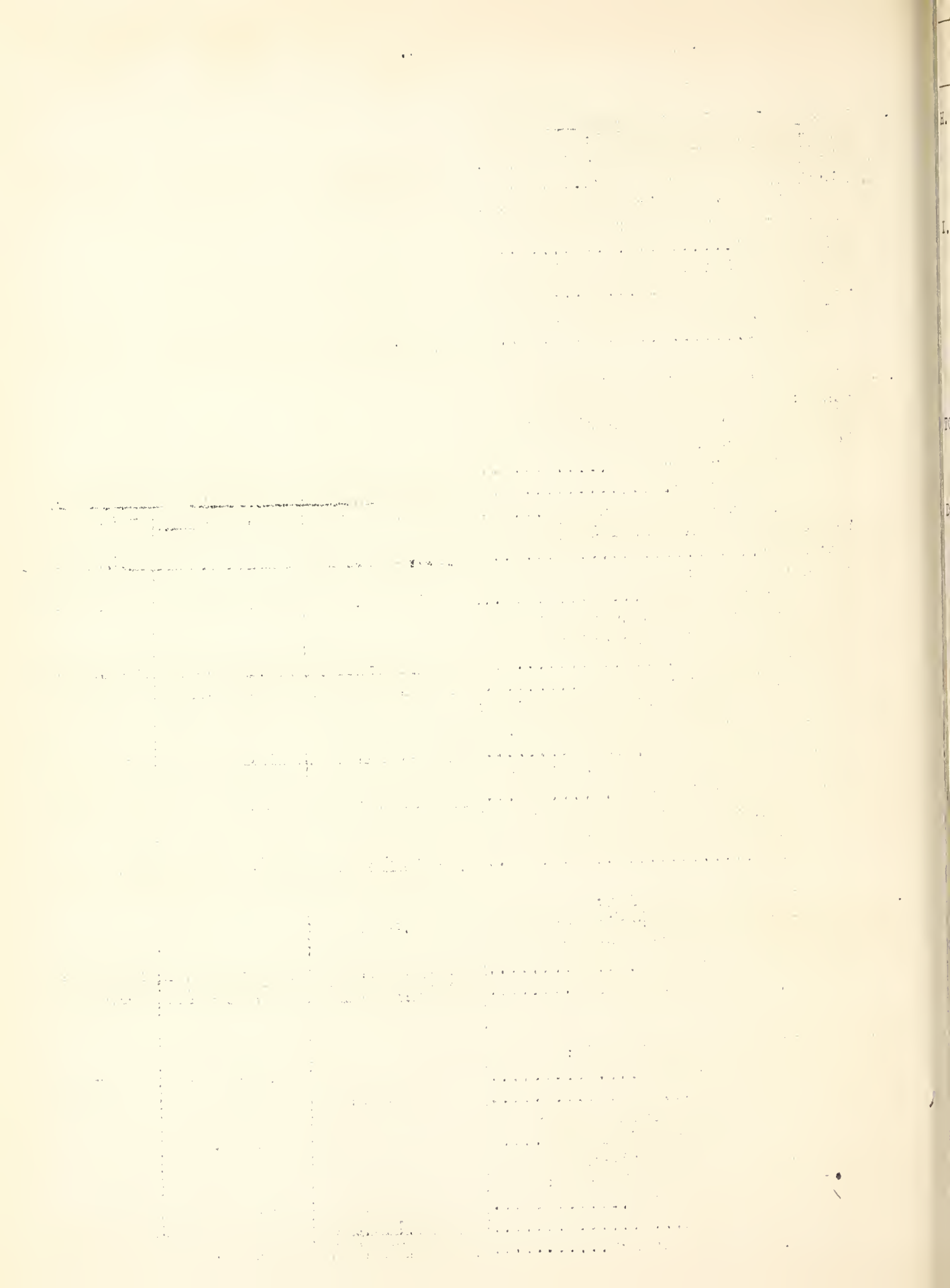
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| Item  | Appropriation<br>1939 | Budget<br>Estimate,<br>1940 | Increase or<br>Decrease,<br>1940 |
|---|-----------------------|-----------------------------|----------------------------------|
| D. <u>Payments to States (exclusive of road<br/>funds and receipt funds):</u>                                 |                       |                             |                                  |
| Agricultural experiment stations.....   | \$6,541,250           | \$6,850,000                 | + \$308,750                      |
| Agricultural extension work.....  | 17,917,583            | 18,247,583                  | + 330,000                        |
| Cooperative forest fire prevention...   | 2,000,000             | 2,000,000                   | - -                              |
| Cooperative farm forestry (Clarke-<br>McNary Act).....  | 100,000               | 100,000                     | - -                              |
| Federal-aid, Wildlife Restoration,<br>Receipt Limitation.....   | 1,000,000             | 1,000,000                   | - -                              |
| Total, Payments to States, as<br>above.....   | 27,558,833            | 28,197,583                  | + 638,750                        |
| E. <u>Agricultural Adjustment and Related<br/>Funds:</u>  |                       |                             |                                  |
| Conservation and Use of Agricultural<br>Land Resources:   |                       |                             |                                  |
| Direct appropriation.....   | 345,000,000           | 415,000,000                 | +70,000,000                      |
| Reappropriation.....  | 155,000,000           | 70,000,000                  | -85,000,000                      |
| Total, Conservation and Use.....  | 500,000,000           | 485,000,000                 | -15,000,000                      |
| Price Adjustment Act of 1938 (Parity<br>payments).....  | 212,000,000           | - -                         | -212,000,000                     |
| Sugar Act of 1937:  |                       |                             |                                  |
| Direct appropriation.....   | 48,000,000            | 32,000,000                  | -16,000,000                      |
| Reappropriation from unobligated<br>balance of 1938 appropriation<br>under this head.....                     | - -                   | 16,000,000                  | +16,000,000                      |
| Total, Sugar Act of 1937.....   | 48,000,000            | 48,000,000                  | - -                              |
| Exportation and Domestic Consumption<br>of Agricultural Commodities (Sec.<br>32, Act of August 24, 1935)..... | (h) 144,024,893       | 90,000,000                  | -54,024,893                      |
| Retirement of Cotton Pool Participa-<br>tion Trust Certificates.....  | 1,800,000             | - -                         | - 1,800,000                      |
| Total, Agricultural Adjustment<br>etc. (including reappropria-<br>tions).....                                 | 905,824,893           | 623,000,000                 | -282,824,893                     |
| F. <u>Federal Crop Insurance Act:</u>   |                       |                             |                                  |
| Administrative and operating expenses (i)   | 5,500,000             | 6,000,000                   | + 500,000                        |
| Subscriptions to capital stock<br>(Treasury Department).....  | (i) 20,000,000        | - -                         | -20,000,000                      |
| Total, Crop Insurance Act.....  | (i) 25,500,000        | 6,000,000                   | -19,500,000                      |
| G. <u>Farm Tenant Act:</u>  |                       |                             |                                  |
| Farm Tenancy (Loans, Title I):  |                       |                             |                                  |
| Direct appropriation.....   | 25,000,000            | 25,000,000                  | - -                              |
| Reappropriation.....  | 551,404               | - -                         | - 551,404                        |
| Liquidation and Management of Re-<br>settlement Projects (Title IV).....                                      | 2,000,000             | 2,000,000                   | - -                              |
| Land Utilization and Retirement of<br>Sub-marginal Land (Title III):  |                       |                             |                                  |
| Direct appropriation.....   | 5,000,000             | 5,000,000                   | - -                              |
| Reappropriation.....  | 8,188,393             | - -                         | - 8,188,393                      |
| Total, Farm Tenant Act.....   | 40,739,797            | 32,000,000                  | - 8,739,797                      |



| Item  | Appropriation<br>1939 | Budget<br>Estimate,<br>1940 | Increase or<br>Decrease,<br>1940 |
|---|-----------------------|-----------------------------|----------------------------------|
| H. Loans, Relief, and Rural Rehabilitation: (j)                       |                       |                             |                                  |
| Direct appropriation.....   | \$175,000,000         | - -                         | +\$175,000,000                   |
| Reappropriation.....  | 22,804,714            | - -                         | - 22,804,714                     |
| Total, Loans, Relief, and etc. ....                                   | 197,804,714           | - -                         | -197,804,714                     |
| I. Road Funds:  |                       |                             |                                  |
| Federal-aid highway system.....                                       | 125,000,000           | \$125,000,000               | - -                              |
| Federal-aid secondary or feeder roads..                               | 20,000,000            | 25,000,000                  | + 5,000,000                      |
| Elimination of grade crossings.....                                   | 40,000,000            | 50,000,000                  | +10,000,000                      |
| Public-lands highways.....  | 2,500,000             | 1,000,000                   | - 1,500,000                      |
| Forest roads and trails.....  | 14,000,000            | 12,000,000                  | - 2,000,000                      |
| Total, Road Funds.....  | 201,500,000           | 213,000,000                 | +11,500,000                      |
| TOTAL, DEPARTMENT OF AGRICULTURE<br>(including reappropriations)..... | 1,511,697,683         | 1,014,390,851               | -497,306,832                     |
| DEDUCT REAPPROPRIATIONS AND TRANSFER<br>INCLUDED IN THE FOREGOING:    |                       |                             |                                  |
| Eradicating tuberculosis and Bang's<br>disease (Animal Industry)..... | - 6,600,000           | - 1,227,000                 | + 5,373,000                      |
| Control of European Fowl Pest (Animal<br>Industry).....               | - 5,000               | - 5,000                     | - -                              |
| Farm Tenant Act:  |                       |                             |                                  |
| Title I (Tenancy Loans).....  | - 551,404             | - -                         | + 551,404                        |
| Title III (Submarginal Land Program)                                  | - 8,188,393           | - -                         | + 8,188,393                      |
| Loans, Relief, and Rural Rehabil-<br>itation.....                     | - 22,804,714          | - -                         | + 22,804,714                     |
| Conservation and use of agricultural<br>land resources.....           | - 155,000,000         | - 70,000,000                | + 85,000,000                     |
| Sugar Act of 1937.....  | - -                   | - 16,000,000                | -16,000,000                      |
| Crop insurance.....   | - 25,500,000          | - -                         | + 25,500,000                     |
| Flood control (transfer from War Dept.)                               | - 7,000,000           | - 3,000,000                 | + 4,000,000                      |
| Total, deductions, as above.....                                      | - 225,649,511         | - 90,232,000                | +135,417,511                     |
| TOTAL, DIRECT APPROPRIATIONS, DEPARTMENT<br>OF AGRICULTURE.....       | 1,286,048,172         | 924,158,851                 | -361,889,321                     |





- (a) Excludes \$1,227,000 to be available for obligation in 1940.
- (b) Includes \$5,000 reappropriated for control of European fowl pest.
- (c) Includes \$60,000 provided by Second Deficiency Appropriation Act, 1938.
- (d) Includes \$55,000 provided by Second Deficiency Appropriation Act, 1938.
- (e) Provided by 2nd Deficiency Act, 1938, to be available until June 30, 1939; in addition, the \$2,000,000 appropriated by Pub. Res. 81, approved March 2, 1938, continues available until June 30, 1939.
- (f) Provided by War Department Civil Appropriation Act, 1939.
- (g) Provided by Second Deficiency Appropriation Act, 1938.
- (h) \$65,000,000 earmarked for "Cotton Price Adjustment" by Third Deficiency Act, 1937.
- (i) Reappropriation from "Conservation and Use of Agricultural Land Resources, 1938."
- (j) Appropriated by Sec. 1 (3) of the Emergency Relief Appropriation Act of 1938.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be carefully documented to ensure the integrity of the financial data. This includes recording dates, amounts, and the nature of the transactions.

The second part of the document provides a detailed breakdown of the various types of transactions that may occur. It categorizes them into different groups, such as sales, purchases, and transfers, and provides examples of how each type should be recorded. This section is designed to help users understand the correct format and content for their entries.

The third part of the document discusses the importance of regular reconciliation. It explains how comparing the recorded transactions with the actual bank statements or other external records can help identify any discrepancies or errors. This process is crucial for maintaining the accuracy of the financial records and for detecting any potential fraud or mismanagement.

The fourth part of the document provides a summary of the key points discussed in the previous sections. It reiterates the importance of accuracy, proper documentation, and regular reconciliation. It also provides some final advice on how to approach the task of maintaining financial records, emphasizing the need for consistency and attention to detail.



## OFFICE OF THE SECRETARY

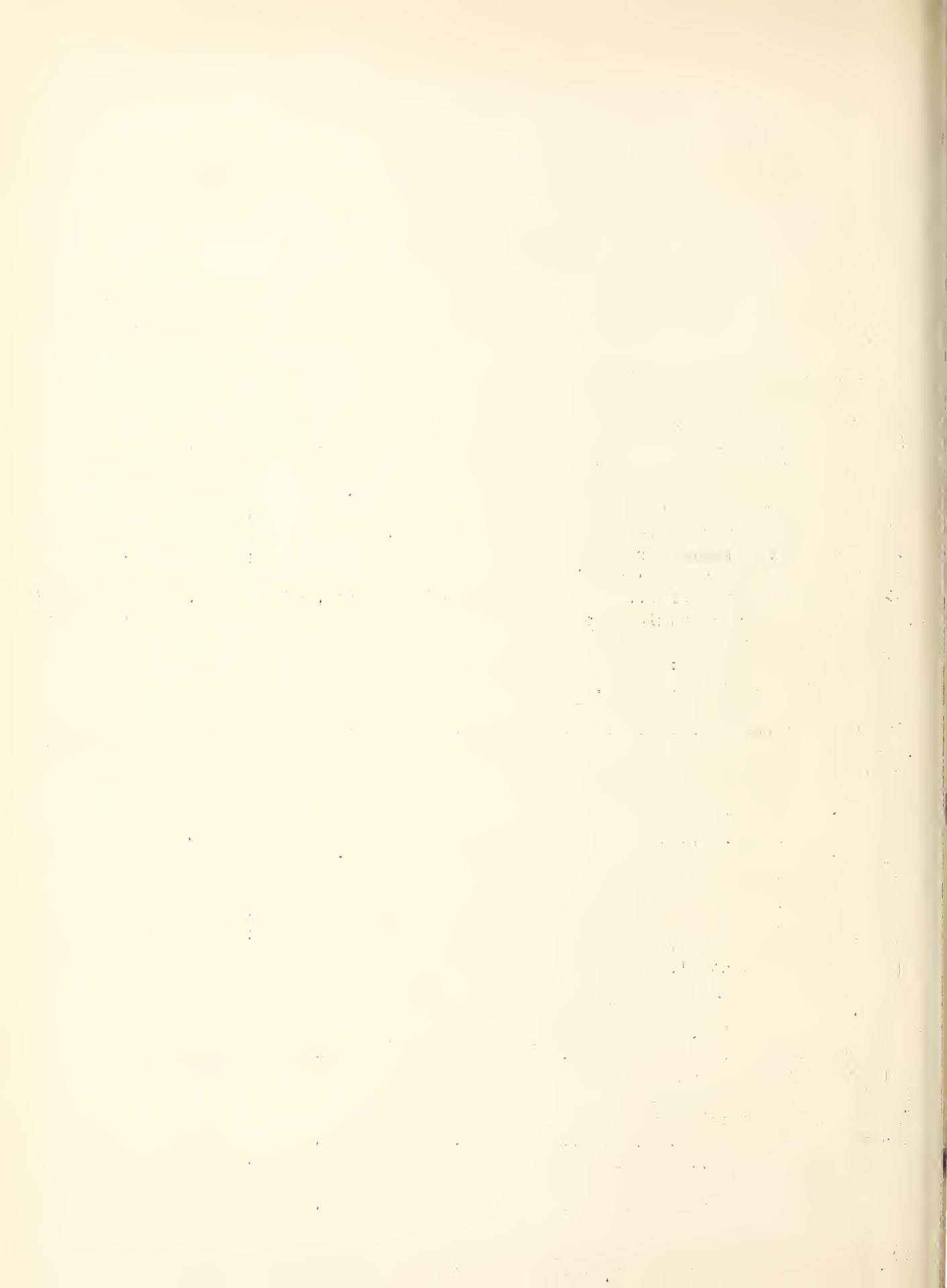
## (a) SALARIES, OFFICE OF THE SECRETARY

|                              |               |
|------------------------------|---------------|
| Appropriation Act, 1939..... | \$581,920     |
| Budget Estimate, 1940.....   | 620,720       |
| Increase.....                | <u>38,800</u> |

## PROJECT STATEMENT

| Projects  | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase              |
|---|-------------|---------------------|---------------------|-----------------------|
| 1. <u>General administration</u> (including offices of the Secretary, Under Secretary, and Assistant Secretary).....  | \$66,361    | \$73,880            | \$73,880            | -----                 |
| 2. <u>Personnel administration and service</u> (including divisions of appointment records; classification, planning, and surveys; investigations; personnel relations, safety, and health; and qualification and training).....  | 132,580     | 130,840             | 139,640             | +\$8,800/<br>(1-a)    |
| 3. <u>Budget and finance administration and service</u> (including divisions of accounts; estimates and reports; purchase, sales, and traffic; and bureau accounting service).....  | 193,667     | 192,780             | 222,780             | +30,000/<br>(1-b,1-c) |
| 4. <u>General operations</u> (including real estate and housing; mails and files; telegraph and telephones; property; post office; labor force, etc. ....)  | 117,884     | 115,420             | 115,420             | -----                 |
| 5. <u>Land-use coordination</u> (departmental coordination of all land-use surveys, policies, and programs, including soil conservation, erosion control, rural rehabilitation, flood control, purchase and utilization of submarginal land, and water facilities in the arid and semiarid States, and related programs)..... | -----       | 60,000              | 60,000              | -----                 |
| Reimbursement to National Park Service, Department of the Interior, for guarding rented quarters in Washington, D. C. ....  | 4,370       | 9,000               | 9,000               | -----                 |
| Unobligated balance.....  | 116         | -----               | -----               | -----                 |
| Total appropriation.....  | (a) 514,978 | 581,920             | 620,720             | + 38,800(1)           |

(a) 1938 obligations include allotment of \$62,278 from "Salaries and Expenses, Soil Conservation Service", transferred in Agricultural Appropriation Act for 1939.



## INCREASE

(1) An increase of \$38,800 is requested for urgently needed strengthening of the administrative and fiscal inspection and investigational work and for the central accounting system under the Office of the Secretary, as a means of more effective control and supervision of the work of the Department, as follows:

(a) \$8,800 for the Division of Investigations (2 investigators at \$3500 and 1 clerk at \$1800).

The Department of Agriculture has over 2,000 field stations and offices located throughout the country and engaged in a wide variety of work. Vast quantities of materials and equipment are purchased and used at these stations. Thousands of temporary seasonal employees are employed. Considerable sums of money are received from the sale of surplus products, obsolete or worn-out equipment, fees for services, etc. The Department is naturally concerned with the proper conduct of the operations of these offices. The regular force of six men engaged in this type of investigational work is augmented from time to time to handle special cases arising out of activities for which special allotments of funds can be made from the appropriations for the activities involved in such special cases. But at the present time the small staff of this division is insufficient to take care of many essential investigations involving funds from which special allotments cannot be made available for the purpose. The additional investigators are urgently needed to make investigations of all phases of Department of Agriculture work in the field; to investigate special personnel cases and irregularities that arise in Washington and in the field; and to conduct special investigations, as directed by the Secretary of Agriculture, of matters arising in the conduct of the numerous and widespread activities of the Department of Agriculture and to report factually, impartially, and independently upon such matters.

To administer the work of the Department effectively it is imperative that more adequate means be provided for obtaining direct information upon which the final settlement of matters of the type referred to will be based. More systematic investigation of field activities also will be of assistance to the administrative officers of the various bureaus in Washington and to employees of the Department stationed in the field, often at isolated points, and will tend to discourage and in some instances prevent the development of undesirable situations which arise from time to time.

As the prosecution of this work requires travel throughout the United States, an increase of \$3,200 also is requested under the appropriation "Miscellaneous Expenses, Department of Agriculture" for necessary travel expenses.

(b) \$14,420 for fiscal inspection service (including 2 assistants at \$3,800 each, 2 at \$2,600 each, and one stenographer at \$1,620).

The Regulations of the Department of Agriculture vest in the Director of Finance responsibility for the financial affairs of the Department, including the acquisition, distribution, expenditure, audit, and accounting of

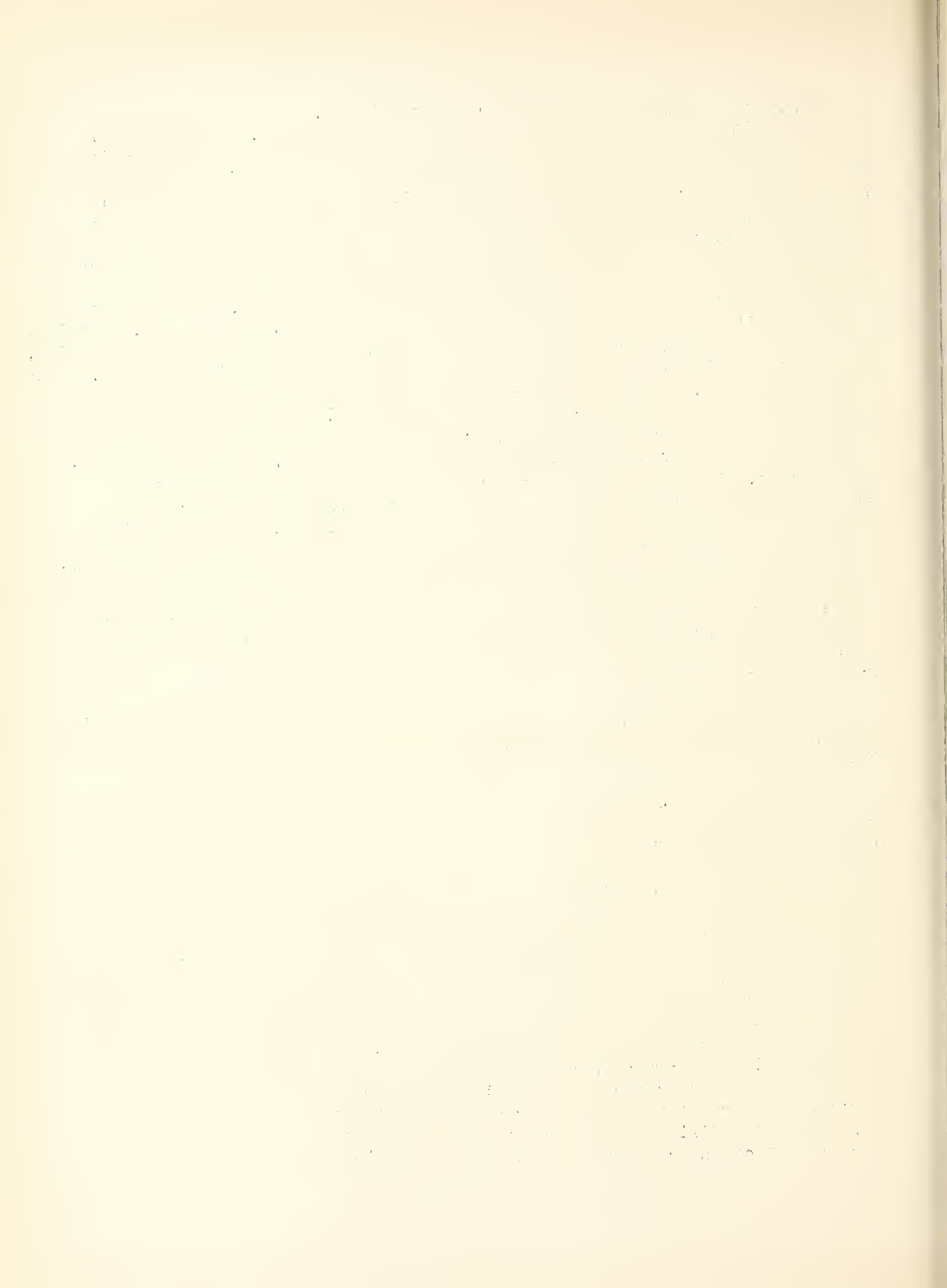


all funds at the disposal of the Department. While, in view of the size and complexity of the fiscal operations of the Department, it is necessary primarily to depend upon the bureau chiefs and their bureau administrative and accounting officers for the proper performance of the fiscal operations, it is urgently necessary that there be a small force in the departmental finance office to keep personally in close contact with the fiscal work and organization of all the bureaus by means of systematic examination of the procedures and methods employed and the condition of the work in the fiscal and accounting offices of the bureaus in Washington and in the regional and other principal fiscal offices in the field. This includes, insofar as the resources will permit, such matters as the systems of fiscal control, auditing, accounting, payroll, collection, bonding, procurement, property accountability, and related work for the purpose of determining conformity with the laws, regulations, and policies governing the use of funds and the adequacy and efficiency with which these functions are performed. Information also is developed by this means as to necessary or desirable changes in Department procedures or requirements and improvements effectuated, wherever possible, cooperating, where indicated, with the General Accounting Office, the Treasury Department, and any other agencies concerned. The fiscal inspection service is intended to promote the most effective and economical handling of the fiscal and accounting work in the Department and, insofar as possible, to prevent financial irregularity by insuring that the accounting controls and requirements are observed and that these are adequate to safeguard the handling of public funds. If in the course of this work specific instances of fiscal or other irregularities are discovered, such cases are to be reported to the Division of Investigations for investigation in the manner prescribed by the Department Regulations.

(c) \$15,580 for the Division of Accounts (1 administrative assistant at \$3,200, 1 principal clerk at \$2,300, 3 clerks at \$1,800 each, 2 clerks at \$1,620 each, and 1 junior clerk at \$1,440.)

The amount requested represents a conservative estimate of the sum which will be needed during 1940 toward placing the general control books and accounts of the Department on a more effective basis. Representatives of the General Accounting Office are engaged in the development of a new system of central accounting control for the Department. This does not contemplate an additional system, or the duplication of the allotment and other operating accounting records necessarily maintained by the several bureaus, but rather the modernization and improvement of the existing system so as to provide the generalized information necessary for proper Department administration and control and the assurance that the procedures developed for the protection of the receipt and expenditure of public funds have been properly observed. The existing central accounting control system was developed over eleven years ago, revised in 1930, and only superficially adapted to the change in conditions at the time the disbursing function of the Department was transferred to the Treasury Department in 1934. The system has not been modified to meet the tremendous growth of the Department or in recognition of the changes since developed in disbursing and accounting





procedure. It is not possible to say with certainty at this time that the specific positions indicated in the foregoing will be exactly those which will be required as the exact types of personnel which will be needed can only be determined as the changes in the central accounting system are put into effect. A rather complete reorganization of the present system is needed and is contemplated, which will require reconsideration of the entire central accounting organization. The amount requested, however, is an extremely conservative estimate of the minimum additional sum which it is believed will be needed for this purpose.

#### WORK UNDER THIS APPROPRIATION

General.--This appropriation is used for salaries of employees of the Office of the Secretary of Agriculture, Under Secretary, Assistant Secretary, Office of Personnel, Office of Budget and Finance, Office of Land Use Coordination, and the Division of Operation, including such activities as land-use coordination, the appointment, salary classification, personnel relations, safety and health, qualification and training, and investigations divisions, the finance, accounting, purchases, sales and traffic divisions, mail and files, telephone and telegraph, post office, emergency rooms, real estate and housing, building directory and information, and motor transport services, labor force, etc. This organization, as supplemented by employees paid from appropriations for activities that require personnel, fiscal, accounting, general administrative coordinating, and related departmental services, provides for the general administration and supervision of the work of the Department.

1. General Administration.--The Offices of the Secretary, Under Secretary, and Assistant Secretary exercise general supervision and control over the Department as a whole, and formulate, establish, and arrange for the carrying out of policies affecting agriculture in its broadest sense.

2. Personnel Administration and Service.--The Office of Personnel is in charge of the personnel work of the Department. This office unifies methods of procedure and applications of policy in regard to personnel; advises with the several bureaus and offices on organization, job classification, placement, training, and procedure; maintains records, renders reports, and makes all contacts with other Government agencies on matters relating to personnel; investigates cases of delinquency among employees and recommends appropriate disciplinary action; interprets the regulations applying to leave and efficiency ratings; reviews proposed changes affecting the status of employees and recommends appropriate action to the Secretary; organizes and develops programs of safety education and elimination of accident hazards; and sponsors and promotes educational courses for employees, welfare activities, and other measures which may contribute to improve the general morale of the Department.





3. Budget and Finance Administration and Service.--The Office of Budget and Finance has general supervision over the fiscal business of the Department. It prepares, in cooperation with the bureaus, the annual budget for the Department; prepares reports on appropriations and expenditures; consults and advises with the bureaus on fiscal matters; maintains the uniform project system covering the program of work of the Department, and appropriation control and related accounts for the Department as a whole; maintains a Bureau Accounting Service for certain of the bureaus which do not maintain bureau accounting offices; and supervises and coordinates activities involving purchases, sales, and traffic within the Department. This office conducts the business of the Department with the Bureau of the Budget, the General Accounting Office, the Treasury Department, the Appropriations Committees, and other agencies of the Government concerned with fiscal and related matters.

4. General Operations.--The Division of Operation is responsible for the management of the buildings and other facilities occupied or used by the Department of Agriculture in the District of Columbia, the telephone and telegraph service, the mails and files, post office, and motor-truck and other service units. The chief of this division also acts as real-estate officer of the Department and as personnel and administrative officer for the internal operation of the Office of the Secretary, and supervises, in addition to the above-mentioned activities, the work of the immediate office comprising real estate and housing, personnel, engineering advice, preparation of budget estimates for the Office of the Secretary, the labor group, and the building directory and information service.

5. Land-Use Coordination.--The Office of Land-Use Coordination directs the administrative coordination of land policy, water policy, and land-survey activities as they relate to the work of the Department as a whole, including (1) correlation of existing action programs that affect land use, (2) clearance of land acquisition projects, (3) general supervision of the water facilities program which is administered by three participating bureaus, (4) establishment of uniform standards for all survey work relating to land use, and clearance and coordination of proposed survey projects, (5) interdepartmental coordination in cooperation with the National Resources Committee, Farm Credit Administration, Department of the Interior, and other agencies, (6) cooperation with the Director of Research and chiefs of bureaus in coordinating land-use research with the land-use action programs, and (7) cooperation with the Agricultural Program Board and the heads of action agencies in coordinating basic land-use policies and programs.

#### QUARTERS, HEAT, AND LIGHT ALLOWANCE AUTHORIZATIONS FOR 1940

An increase from \$40,000 to \$54,000 is recommended in the amount of the proviso contained in the appropriation for "Salaries, Office of the Secretary" which limits the total that may be paid from the several bureau appropriations applicable as allowances to officers and employees of the Department of Agriculture permanently stationed in foreign countries for living quarters, including heat, fuel, and light, under the provisions of the Act of June 26, 1930 (5 U.S.C. 118a).



The estimated allocations to the bureaus involved, on a per annum basis, for the fiscal years 1939 and 1940 are:

|   | <u>F.Y. 1939</u> | <u>F.Y. 1940</u> |
|---|------------------|------------------|
| Foreign Agricultural Service.....                   | \$23,900         | \$38,200         |
| Animal Industry.....                                | 1,400            | 1,400            |
| Entomology and Plant Quarantine.....                | 10,140           | 10,140           |
| Plant Industry.....                                 | 720              | ---              |
| Departmental reserve authority<br>for contingencies | <u>3,840</u>     | <u>4,260</u>     |
|   | 40,000           | 54,000           |

An increase of \$14,300 is recommended in the allowance for quarters, heat, light, etc., incident to personal services, Foreign Agricultural Service. This amount is included in the increase of \$250,000 recommended under the "Foreign Agricultural Service" appropriation for expansion of work in the Latin American countries and will provide allowances for an agricultural attache and assistant agricultural attache at each of the following cities: Havana, Cuba, Mexico City, Mexico, Panama City, Panama, and Rio de Janeiro, Brazil, together with a reserve of \$1,900 for contingencies.

The allocation to the Bureau of Plant Industry is omitted in 1940, and the amount available for departmental reserve has been increased from \$3,840 to \$4,260 to provide for possible changes in assignment of foreign service employees, changes in classification of posts, and for other unforeseen contingencies during the year.

A detailed schedule of the allowance amounts for 1938 and the estimated amounts for 1939 and 1940 follows:



Schedule of Allowances for Quarters, Heat, and Light of Employees  
Permanently Stationed Abroad Under Act of June 26, 1930

| Appropriation and<br>Subappropriation         | Title of<br>position | Post<br>of duty      | Classi-<br>fica-<br>tion<br>of post. | Domes-<br>tic<br>Sta-<br>tus | Group | Salary  | Allowances |         |         |
|---|----------------------|----------------------|--------------------------------------|------------------------------|-------|---------|------------|---------|---------|
|   |                      |                      |                                      |                              |       |         | Estimated  | Actual, |         |
|   |                      |                      |                                      |                              |       |         | 1940       | 1939    | 1938    |
| Foreign Agricultural<br>Service:              | Agri. Attache        | Belgrade, Yugoslavia | IV                                   | M                            | 2     | \$6,000 | \$1,500    | \$1,500 | \$1,500 |
|   | Agri. Attache        | Berlin, Germany      | V                                    | M                            | 2     | 6,200   | 1,700      | 1,700   | 1,700   |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 4,200   | 1,500      | 1,500   | 1,500   |
|   | Agri. Commissioner   | "                    | V                                    | M                            | 2     | 5,800   | 1,600      | 1,600   | 1,600   |
|   | Agri. Commissioner   | Bombay, India        | V                                    | M                            | 2     | 4,800   | ---        | ---     | 200     |
|   | Agri. Attache        | Buenos Aires, Arg.   | V                                    | M                            | 2     | 6,000   | 1,700      | 1,700   | 1,700   |
|   | Asst. Agri. Attache  | "                    | V                                    | S                            | 3     | 4,600   | 1,000      | 1,000   | ---     |
|   | Agri. Attache        | Havana, Cuba         | V                                    | M                            | 2     | 5,600   | 1,700      | ---     | ---     |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 4,600   | 1,500      | ---     | ---     |
|   | Agri. Attache        | London, England      | V                                    | M                            | 2     | 6,000   | 1,700      | 1,700   | 1,700   |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 5,000   | 1,500      | 1,500   | 1,500   |
|   | Agri. Commissioner   | "                    | V                                    | M                            | 2     | 6,000   | 1,600      | 1,600   | 1,600   |
|   | Agri. Commissioner   | "                    | V                                    | M                            | 2     | 6,000   | 1,600      | 1,600   | 1,600   |
|   | Prin. Mktg. Spec.    | Manchester, England  | IV                                   | M                            | 2     | 6,000   | 1,500      | 1,500   | 1,030   |
|   | Agri. Attache        | Mexico City, Mexico  | V                                    | M                            | 2     | 5,600   | 1,700      | ---     | ---     |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 4,600   | 1,500      | ---     | ---     |
|   | Agri. Attache        | Panama City, Panama  | IV                                   | M                            | 2     | 5,600   | 1,500      | ---     | ---     |
|   | Asst. Agri. Attache  | "                    | IV                                   | M                            | 3     | 4,600   | 1,300      | ---     | ---     |
|   | Act. Agri. Attache   | Paris, France        | V                                    | M                            | 2     | 4,800   | 1,500      | 1,500   | 1,558   |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 3,200   | 1,200      | 1,200   | 1,000   |
|   | Technical Asst.      | "                    | V                                    | M                            | 4     | 1,200   | 600        | 600     | 550     |
|   | Agri. Attache        | Rio de Janeiro, Br.  | V                                    | M                            | 2     | 5,600   | 1,700      | ---     | ---     |
|   | Asst. Agri. Attache  | "                    | V                                    | M                            | 3     | 4,600   | 1,500      | ---     | ---     |
|   | Agri. Commissioner   | Shanghai, China      | V                                    | M                            | 2     | 6,000   | 1,700      | 1,700   | 1,700   |
|   | Asst. Agri. Comm.    | "                    | V                                    | M                            | 3     | 4,800   | 1,500      | 1,500   | 1,250   |
|   | Asst. Agri. Comm.    | Unassigned           | -                                    | -                            | -     | 3,800   | ---        | ---     | ---     |
|   | Agri. Attache        | "                    | -                                    | -                            | -     | 5,600   | ---        | ---     | ---     |
|   | Reserve.....         | .....                | .....                                | .....                        | ..... | .....   | 2,400      | 500     | ---     |
| Total, Foreign Agri-<br>cultural Service..... |                      |                      |                                      |                              |       |         | 38,200     | 23,900  | 21,688  |





| Appropriation and subappropriation                        | Title of position   | Post of duty                         | Classi-<br>fica-<br>tion<br>of post | Domes-<br>tic<br>Sta-<br>tus | Group | Salary  | Allowances        |        | Actual,<br>1938 |
|---|---------------------|--------------------------------------|-------------------------------------|------------------------------|-------|---------|-------------------|--------|-----------------|
|   |                     |                                      |                                     |                              |       |         | Estimated<br>1940 | 1939   |                 |
| <u>Bureau of Entomology</u>                               |                     |                                      |                                     |                              |       |         |                   |        |                 |
| <u>and Plant Quarantine:</u>                              |                     |                                      |                                     |                              |       |         |                   |        |                 |
| Salaries and expenses:                                    |                     |                                      |                                     |                              |       |         |                   |        |                 |
| Fruit Insects.....  |                     |                                      |                                     |                              |       |         |                   |        |                 |
|   | Prin. Entomologist  | Mexico City, Mexico                  | V                                   | M                            | 2     | \$5,800 | \$720             | \$720  | \$720           |
|   | Senior Entomologist | " "                                  | V                                   | M                            | 3     | 4,600   | 720               | 720    | 720             |
|   | Assoc. Entomologist | " "                                  | V                                   | M                            | 3     | 3,200   | 720               | 720    | 720             |
|   | Assoc. Chemist      | " "                                  | V                                   | M                            | 3     | 3,200   | 720               | 720    | 360             |
|   | Asst. Entomologist  | " "                                  | V                                   | S                            | 3     | 3,000   | ---               | ---    | 410             |
|   | Junior Entomologist | " "                                  | V                                   | M                            | 3     | 2,000   | 720               | 720    | 390             |
|   | Asst. Entomologist  | Hacienda Santa En-<br>gracia, Mexico | II                                  | M                            | 3     | 2,800   | 660               | 660    | 495             |
| Forest Insects .....                                      |                     |                                      |                                     |                              |       |         |                   |        |                 |
|   | Assoc. Entomologist | Oxford, England                      | III                                 | M                            | 2     | 3,200   | 720               | 720    | 720             |
| Foreign Parasites .....                                   |                     |                                      |                                     |                              |       |         |                   |        |                 |
|   | Assoc. Entomologist | Yokohama, Japan                      | IV                                  | S                            | 2     | 3,200   | 1,020             | 1,020  | 1,020           |
|   | Asst. Entomologist  | " "                                  | IV                                  | S                            | 3     | 2,600   | 900               | 900    | 225             |
|   | Entomologist        | St. Cloud, France                    | V                                   | M                            | 2     | 4,400   | 1,200             | 1,200  | 1,200           |
|   | Assoc. Entomologist | " "                                  | V                                   | M                            | 3     | 3,200   | 1,020             | 1,020  | 1,020           |
|   | Assoc. Entomologist | " "                                  | V                                   | M                            | 3     | 3,200   | 1,020             | 1,020  | 1,020           |
| Total, Bureau of Entomology<br>and Plant Quarantine ..... |                     |                                      |                                     |                              |       |         |                   |        |                 |
|   |                     |                                      |                                     |                              |       | 44,400  | 10,140            | 10,140 | 9,020           |





| Appropriation and subappropriation   | Title of position   | Post of duty    | Classification of post | Domestic status | Group | Salary  | Allowances     |                |              |
|--|---------------------|-----------------|------------------------|-----------------|-------|---------|----------------|----------------|--------------|
|  |                     |                 |                        |                 |       |         | Estimated 1940 | Estimated 1939 | Actual, 1938 |
| Bureau of Plant Industry:<br>Salaries and expenses:<br>Forest Pathology                | Assoc. Pathologist  | Oxford, England | III                    | M               | 2     | \$3,200 | -----          | \$720          | \$570        |
| Bureau of Animal Industry<br>Salaries and expenses:<br>Inspection and Quarantine ..... | Senior Veterinarian | London, England | V                      | M               | 2     | 4,600   | \$1,400        | 1,400          | 1,400        |
| Grand Total .....  |                     |                 |                        |                 |       | 189,000 | 49,740         | 36,160         | 32,678       |



## (b) MISCELLANEOUS EXPENSES, DEPARTMENT OF AGRICULTURE

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$108,250      |
| Budget Estimate, 1940.....   | <u>111,450</u> |
| Increase.....                | <u>3,200</u>   |

## PROJECT STATEMENT

| Projects  | 1938         | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase     |
|---|--------------|---------------------|---------------------|--------------|
| Miscellaneous Expenses, Department<br>of Agriculture..... | \$97,571 (a) | \$108,250           | \$111,450           | +\$3,200 (1) |
| Unobligated balance.....                                  | 8,179        | ----                | ----                | ----         |
| Total appropriation.....                                  | 105,750 (a)  | 108,250             | 111,450             | +3,200       |

(a) Exclusive of \$5,650 unobligated balance, 1937, continued available in 1938 for moving expenses in connection with occupancy of new South Building.

## INCREASE

(1) An increase of \$3,200 in this item is requested for travel expenses for inspection and investigational work. This amount is required to provide for transportation, per diem, and incidental travel expenses of the additional investigators requested under the appropriation for "Salaries, Office of the Secretary", as well as for a necessary increase in the amount available for travel expenses of the present investigational staff of the Department. The Division of Investigations directs and conducts investigations in connection with all phases of departmental work in the field and of special personnel cases and irregularities both in Washington and in the field. Travel to all parts of the United States is required and the pressure of work makes it necessary for all investigators to remain at least nine months each year in the field. Frequently the necessity for conducting certain investigations arises suddenly, and it is impossible to foresee these situations. In order to make available funds necessary for the efficient prosecution of the investigational work, the increase herein requested is urgently recommended.

## WORK UNDER THIS APPROPRIATION

This appropriation, as indicated by its terms, provides for a great variety of miscellaneous objects and services necessary in the conduct of the work of the Department, including stationery, supplies, materials, and equipment, communication service, postage, freight, express, and drayage charges, laundry, repairs and alterations, advertising and press clippings, travel expenses, maintenance and operation of motor vehicles, and miscellaneous supplies and expenses not otherwise provided for and necessary for the practical and efficient work of the Department. It provides also for the compensation of the personnel of the Motor Transport Service and of



such personnel of the Central Supply Section as may be engaged in the procurement, storage, issue, and shipment of supplies and materials for the several bureaus of the Department, reimbursement being made to this appropriation from the funds of the bureaus for which service is rendered.

(c) RENT OF BUILDINGS IN THE DISTRICT OF COLUMBIA

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$180,655      |
| Budget Estimate, 1940.....   | <u>193,600</u> |
| Increase.....                | <u>12,945</u>  |

PROJECT STATEMENT

| Projects  | 1938          | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase      |
|---|---------------|---------------------|---------------------|---------------|
| Rent of Buildings in the<br>District of Columbia..... | (a) \$169,279 | (b) \$180,655       | \$193,600           | +\$12,945 (1) |
| Unobligated balance.....                              | 2,930         | ----                | ----                | ----          |
| Total appropriation....                               | (a) 172,209   | (b) 180,655         | 193,600             | +12,945       |

(a) 1938 obligations include allotments of \$124,209 from "Salaries and Expenses, Soil Conservation Service" and \$15,000 from "National Forest Administration, Forest Service", transferred in Agricultural Appropriation Act for 1939.

(b) Exclusive of allotments from following appropriation items under authorization contained in Second Deficiency Act, Fiscal Year 1938 (Public No. 723, 75th Congress):

|   |              |
|---|--------------|
| "Salaries and Expenses, Soil Conservation Service, Soil and Moisture Conservation Operations, Demonstrations, and Information"..... | \$4,724      |
| "Federal Aid, Wildlife Restoration, Department of Agriculture (Receipt Limitation)" .....   | 1,800        |
| "National Industrial Recovery, Agriculture, Wildlife Refuges, (B.S.)" .....   | 700          |
| "Salaries and Expenses, Weather Bureau, Aerology" .....   | <u>2,920</u> |
|   | 10,144       |

INCREASE

(1) The increase of \$12,945 in this item is requested to provide for the continued rental during the fiscal year 1940 of necessary additional space leased during 1939 for the use of the Weather Bureau, the Soil Conservation Service, and the Bureau of Biological Survey. During 1939 the rental of this space has been accomplished from funds transferred under the





authorization contained in the Second Deficiency Act, fiscal year 1938 (Public No. 723, 75th Congress), and it is necessary to provide for these rentals in 1940 under the "Rent of Buildings" appropriation item, as follows:

(a) \$2,523 for rental of space for Bureau of Biological Survey. During 1939 an increase in work in connection with the administration of the Pittman-Robertson Wildlife Restoration Act made necessary the leasing of additional office space for the Bureau of Biological Survey. Quarters were secured in the McGill Building, 908 G Street, Northwest, under a lease which is renewable for the fiscal year 1940 at a rental of \$2,523 per annum.

(b) \$2,920 for rental of space for Weather Bureau. To relieve overcrowded conditions in the present Weather Bureau buildings and to provide quarters for an additional hydrologic unit for the study of precipitation on watersheds for the benefit of Army engineers in the conduct of flood-control work, 4,321 square feet of space was leased in the Rizik Building, 1737 L Street, Northwest, at a rental of approximately 67.6 cents per square foot, or \$2,920 per annum.

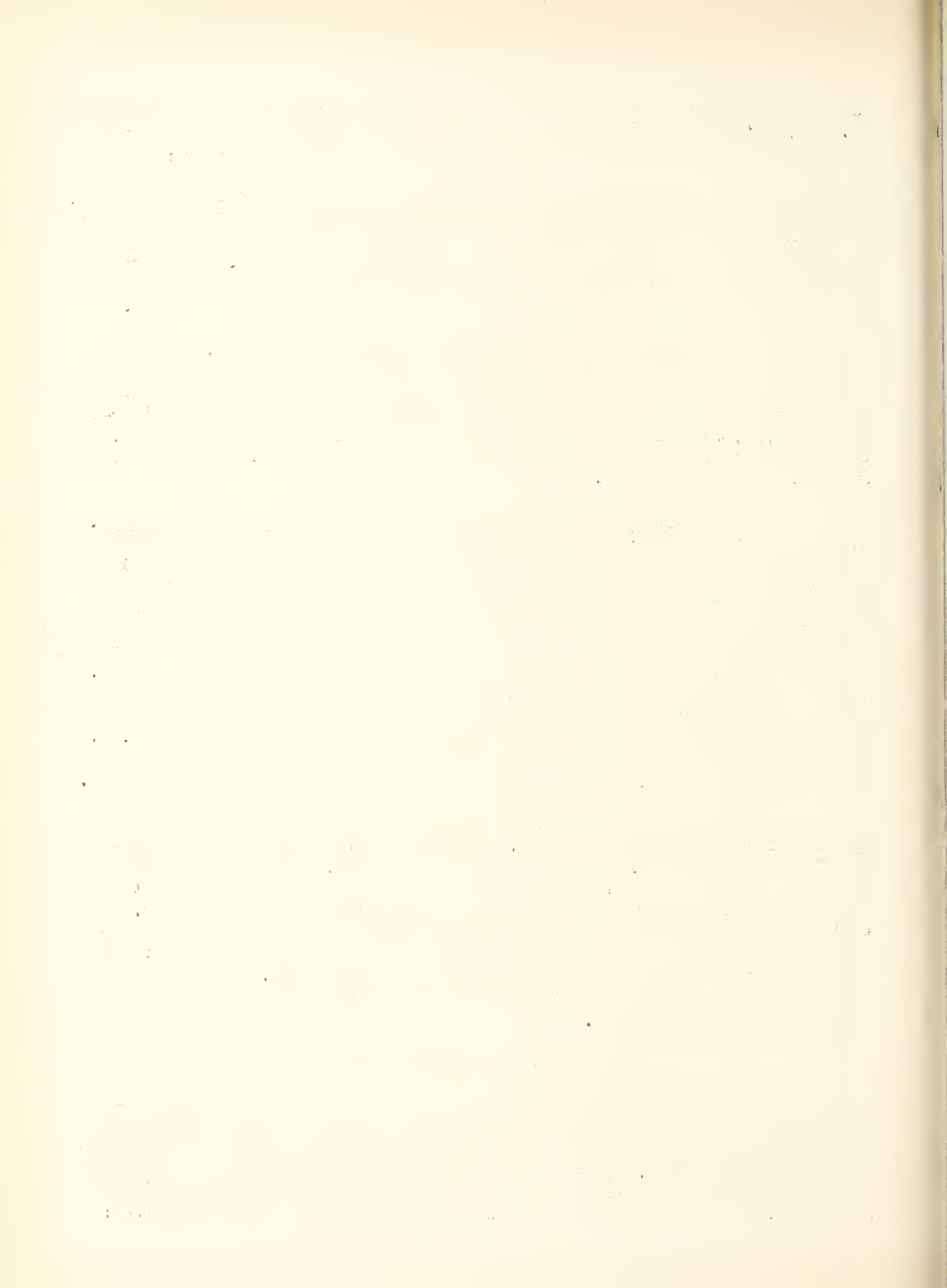
(c) \$5,153 for rental of space for Soil Conservation Service. The work of the Division of Cooperative Relations and Planning in connection with soil-conservation districts resulted in the necessity for providing additional space to meet a greatly increased demand for visual material for use in conducting educational programs among farmers in the districts for exhibit and display purposes at farmers' meetings and local fairs, for answering the requests of schools, granges, soil-conservation district committees, and for the illustration of reports, handbooks, and informational matter. Additional space has also been required by the cartographic section of the Division of Watershed and Conservation Surveys for work in connection with the duplicating of farm conservation surveys by the multilith process. 7,626 square feet of space was provided for the Soil Conservation Service in the Rizik Building, 1737 L Street, Northwest, at a rental of \$5,153 per annum.

(d) \$2,349 to provide additional space for the Weather Bureau and the Soil Conservation Service. Under the authorization contained in the Second Deficiency Act, 1938, above referred to, it may be necessary during the current fiscal year, 1939, to lease additional space for the use of the Soil Conservation Service and possibly the Weather Bureau. Due to the scarcity of available quarters, both in Government-owned and commercial buildings, it has not been possible up to the present time to secure properly located facilities for these organizations. When such space is acquired the amount indicated will be needed to provide for the continued rentals during 1940.

#### WORK UNDER THIS APPROPRIATION

This appropriation provides funds for the rental of office, laboratory, and storage facilities for regular activities of the Department in the District of Columbia for which no quarters are available in Government-owned structures. In the following statement are shown the buildings and parts of buildings rented under this appropriation during the fiscal year 1938, and the estimated rentals for the fiscal years 1939 and 1940:





Statement Showing Estimated Rentals, Fiscal Years 1940, 1939, and 1938.

| <u>Building and Location</u>  | <u>Bureau Occupying Space</u>  | <u>F.Y. 1940</u> | <u>F.Y. 1939</u> | <u>F.Y. 1938</u> |
|---|--------------------------------|------------------|------------------|------------------|
| Standard Oil (261 Const'n Ave. N.W.) ....   | Soil Conservation Service...   | \$68,811         | \$68,811         | \$65,573 (a)     |
| Atlantic (928-930 F Street, N.W.) .....   | Forest Service .....           | 30,000           | 30,000           | 30,000 (b)       |
| Printcraft (930 H St. N.W.) .....   | Soil Conservation Service ..   | 20,560           | 20,560           | 21,999 (a)       |
| Columbian (416 5th St. N.W.) .....  | Soil Conservation Service ..   | 17,619           | 17,619           | 17,972 (a)       |
| McKinley (American University) .....  | Chemistry and Soils .....      | 14,800           | 14,800           | 12,800           |
| Victor (724 9th St. N.W.) .....   | Forest Service .....           | 14,490           | 14,490           | 14,490           |
| Rizik (1737 L St. N.W.) .....   | Soil Con.Svc.& Weather Bur..   | 8,073            | 7,644            | -----            |
| McGill (908 G St. N.W.) .....   | Biological Survey .....        | 2,523            | 3,028            | -----            |
| Stewart (6th & D Sts. N.W.) .....   | Soil Conservation Service ..   | 2,011            | 2,011            | 2,740 (a)        |
| 1214 24th St. N.W. ....   | Weather Bureau .....           | 1,920            | 1,920            | 1,780            |
| 2513 M St. N.W. ....  | Weather Bureau .....           | 1,000            | 1,000            | 1,000            |
| 1653 Penna. Ave. N.W. ....  | Soil Conservation Service ..   | 925              | 925              | 925 (a)          |
| Additional space for Weather Bureau and Soil Conservation Service ....  | Soil Conservation Service .... | 2,349            | -----            | -----            |
| Emergency rentals and reserve for reconditioning rented quarters upon relinquishment where required by terms of lease .....         | -----                          | 8,519            | 7,991            | 2,930            |
|   |                                | 193,600          | 190,799          | 172,209          |
| Deduct rentals included above paid from other appropriations and consolidated with this item in 1939 .....                          | -----                          | -----            | -----            | -139,209         |
| Deduct rentals included above transferred in 1939 from other appropriations under authorization in Second Deficiency Act, 1938 .... | -----                          | -----            | -10,144          | -----            |
| Net "Rent of Buildings" appropriation .....   | 193,600                        | 193,600          | 180,655          | 33,000           |
| (a) Rental paid from Soil Conservation Service funds.   |                                |                  |                  |                  |
| (b) Rental paid from funds transferred from Forest Service and Soil Conservation Service.   |                                |                  |                  |                  |

(For additional rentals - see next page)



Statement showing buildings and parts of buildings  
rented in the District of Columbia other than those estimated  
for under the appropriation for "Rent of Buildings in the Dis-  
trict of Columbia" (as of December 1, 1938)

| Building and location                        | Bureau occupying space                                  | Annual<br>rental rate |
|--|---|-----------------------|
| 1437 K Street, N.W. ....                     | Agricultural Adjust. Adm.                               | \$15,000              |
| Courts (310-312 6th St., N.W.) ....          | do.   | 7,200                 |
| Arlington Hotel (1025 Vermont Ave., N.W.) .. | Agricultural Economics and<br>Soil Conservation Service | 63,500                |
| 400-402 11th St., S.W. ....                  | Agricultural Engineering                                | 6,365                 |
| City Club (1320 G St., N.W.) ....            | Farm Security Admin.                                    | 43,990                |
| Barr (910 17th St., N.W.) ....               | do.   | 43,297                |
| 501 and 513 26th St., N.W. ....              | do.   | 6,300                 |
| 517 26th St., N.W. ....                      | do.   | 1,800                 |
| Victor (724 9th St., N.W.) ....              | Forest Service  | 14,143 (a)            |
| 920 F St., N.W. ....                         | do.   | 600                   |
| Lenox (1523 L St., N.W.) ....                | Public Roads  | 22,924 (b)            |
| Willard (513-515 14th St., N.W.) ....        | do.   | 21,348                |
| 1415 K St., N.W. ....                        | do.   | 8,061                 |
| 1345 E St., N.W. ....                        | do.   | 7,674                 |
| Kellogg (1416 F St., N.W.) ....              | do.   | 7,222                 |
| 509 14th St., N.W. ....                      | do.   | 6,000                 |
| Adams (1333 F St., N.W.) ....                | do.   | 5,431                 |
| Stewart (6th and D Sts., N.W.) ....          | Soil Conservation Service                               | 1,226 (c)             |
| Washington (15th & New York Ave., N.W.) ...  | Office of the Solicitor                                 | 3,225                 |
| 1741 K St. N.W. ....                         | Federal Crop Ins. Coop'n                                | 7,500                 |
| Total .....                                  |   | 292,806               |

- (a) Balance of rental(\$14,490) paid from appropriation for "Rent of Buildings  
in the District of Columbia"
- (b) Rental paid by National Park Service.
- (c) Balance of rental (\$2,011) paid from appropriation for "Rent of Buildings  
in the District of Columbia"



SUPPLEMENTAL FUNDS

| Projects   | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|--|-----------------------------|-----------------------------|-----------------|
| <u>Emergency Relief Act of 1937: Rent of quarters for Soil Conservation Service in the District of Columbia.....</u>   | - -                         | - -                         | \$293           |
| <u>Special Research Fund:</u>  |                             |                             |                 |
| Central accounting records in connection with special research projects.....   | \$1,800                     | \$1,800                     | 1,658           |
| Special research projects (allocation to bureaus and offices to meet commitments and new needs for special research work).   | 150,260                     | 91,450                      | - -             |
| Special research laboratories in major agricultural regions (funds for allocation to bureaus and offices to meet commitments and new needs for special research work).....   | 68,700                      | 119,000                     | - -             |
| Total, Special Research Fund.....  | 220,760                     | 212,250                     | 1,658           |
| <u>Conservation and Use of Agricultural Land Resources: Administrative accounting, auditing, personnel, investigative, and miscellaneous services and expenses, including land-use coordination and coordination of departmental programs in the northern and southern Great Plains areas.....</u> | 360,425                     | 360,425                     | 304,920         |
| <u>Administration of Sugar Act of 1937: Administrative, accounting, auditing, personnel, coordinating, supervisory, and miscellaneous services and expenses.....</u>   | 15,500                      | 15,500                      | - -             |
| <u>Exportation and Domestic Consumption of Agricultural Commodities: Administrative, accounting, auditing, investigative, coordinating, and supervisory, and miscellaneous services and expenses.....</u>  | 67,500                      | 67,500                      | - -             |
| <u>Farm Tenancy, Department of Agriculture: Administrative, accounting, auditing, personnel, land-use coordination, and miscellaneous services and expenses.....</u>   | 20,000                      | 20,000                      | - -             |
| <u>Liquidation and Management of Resettlement Projects: Administrative, accounting, auditing, personnel, and miscellaneous services and expenses.....</u>  | 10,000                      | 10,000                      | - -             |





| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Land Utilization and Retirement of Submarginal Land:</u> Land-use coordination and coordination of departmental programs in the northern and southern Great Plains areas, accounting, auditing, personnel, investigative, and miscellaneous services and expenses..... | \$32,000                    | \$56,675                    | - -             |
| <u>Administration of Federal Crop Insurance Act:</u> Administrative, accounting, auditing, personnel and miscellaneous services and expenses.....   | 42,500                      | 42,500                      | - -             |
| <u>Flood Control, General (transfer to Agriculture):</u><br>Land-use coordination, accounting, auditing, personnel, and miscellaneous services and expenses.....  | 71,868                      | 71,868                      | \$9,354         |
| Pending allocations and commitments for flood control projects.....   | 524,333                     | 4,700,000                   | - -             |
| Total, Flood Control, General.....  | 596,201                     | 4,771,868                   | 9,354           |
| <u>Development of Water Facilities, Arid and Semi-Arid Areas:</u> Land-use coordination and miscellaneous services and expenses.....  | 6,000                       | 5,000                       | - -             |
| <u>Emergency Relief Appropriation Act of 1938:</u> Administrative, accounting, auditing, personnel, investigative, and miscellaneous services and expenses, including land-use coordination... ..   | - -                         | 156,500                     | - -             |
| <u>Emergency Relief Act of 1938 (transfer from W.P.A.):</u> Administrative expenses in connection with Emergency Relief projects...   | - -                         | 10,000                      | - -             |
| <u>National Industrial Recovery, Agriculture, Wildlife Refuges:</u> Miscellaneous expenses for coordination of land-use planning in connection with the acquisition, improvement and development of wildlife refuges....  | - -                         | - -                         | 2,499           |

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| Projects  | Estimated obligations, 1940 | Estimated obligations, 1938 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Public Works Allotments (National Industrial Recovery Act):</u>  |                             |                             |                 |
| Central feed mill and granary at Beltsville (Md.) Research Center.....  | --                          | --                          | 8,547           |
| Acquisition of additional land at Beltsville (Md.) Research Center and dismantling, moving and/or repairing buildings situated thereon..... | --                          | --                          | 12,066          |
| Total, Public Works Allotments .....  | --                          | --                          | 20,613          |
| Total, Supplemental Funds.....  | (a)\$1,370,886              | (b)\$5,728,218              | \$339,337       |

(a) Includes \$524,333 for future allotment to bureaus and offices engaged in flood-control program and \$218,960 for future allotment to bureaus and offices from Special Research Fund.

(b) Includes \$4,700,000 for future allotment to bureaus and offices engaged in flood control programs and \$210,450 for future allotment to bureaus and offices from Special Research Fund.

#### PASSENGER-CARRYING VEHICLES

The authorization under the appropriation for "Miscellaneous Expenses, Department of Agriculture" for the purchase and exchange of one passenger-carrying vehicle, at a net cost of not to exceed \$1,500, contemplates the replacement, during the fiscal year 1940, of a passenger automobile provided for the official use of the Forest Service. At the time of its proposed replacement during the fiscal year 1940, this machine will have been in continuous operation for more than three years. No additional funds are involved in this item.



OFFICE OF THE SOLICITOR

## (a) SALARIES AND EXPENSES

|   |                |
|---|----------------|
| Appropriation Act, 1939 .....   | \$219,240      |
| Allotments from:  |                |
| "Enforcement of the Federal Food, Drug, and<br>Cosmetic Act", Food and Drug Administration..... | +1,620 (1)     |
| "Enforcement of the Commodity Exchange Act",<br>Commodity Exchange Administration .....         | +11,620 (1)    |
| Available, 1939 .....   | 232,480        |
| Budget Estimate, 1940 .....   | <u>232,480</u> |

- (1) Salaries of employees engaged in legal work for the Food and Drug Administration and the Commodity Exchange Administration transferred to this item in the estimates for 1940, with corresponding reduction in funds of the two bureaus named.

## PROJECT STATEMENT

| Project                          | 1938       | 1939      | 1940      |
|----------------------------------|------------|-----------|-----------|
| Legal advice and assistance..... | \$225,438  | \$232,480 | \$232,480 |
| Unobligated balance.....         | 632        | - -       | - -       |
| Total.....                       | (*)226,070 | 232,480   | 232,480   |

(\*) 1938 obligations include allotments of \$7,902 from "General Administrative Expenses", Soil Conservation Service; and \$14,400 from "National Forest Administration", Forest Service, transferred in estimates for 1939.

## WORK UNDER THIS APPROPRIATION

The Office of the Solicitor is the law agency of the Department, in compliance with a statute providing that "the legal work of the Department of Agriculture shall be performed under the supervision and direction of the solicitor" (5 U.S.C. sec. 518). Among the duties performed by the office are advising the Secretary and other administrative officials on legal problems in connection with all phases of their duties; assisting in the preparation of proposed legislative bills, administrative rules and regulations, orders, and proclamations; drafting and examining contracts, deeds, leases, and other documents; examining evidence to determine whether there have been violations of acts administered by the Department and, in proper cases, recommending prosecution to the Attorney General; preparing pleadings and briefs in civil and criminal cases and equity proceeding involving the Department and laws administered by it, and cooperating with the Department of Justice in the handling of such litigation in the lower and appellate courts; representing the Department as counsel in hearings before the Secretary; handling the contracts of the

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Department with other governmental agencies in legal matters; conducting administrative hearings under various acts administered by the Department; prosecuting applications for patents by Department employees where the subject of the patent is used in departmental work; examining titles to lands authorized for purchase or on which loans will be made by the Department; considering and recommending appropriate disposal of claims for damage to property of the United States in the custody of the Department and claims against the Government for damage arising from operations of the Department.

# SUPPLEMENTAL FUNDS

## (1) Direct Allotments

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Agricultural Adjustment Administration</u><br>(Salaries and Expenses): Legal work relating to Agricultural Adjustment Administration programs.....   | \$164,300                   | 164,300                     | 116,785         |
| <u>Exportation and Domestic Consumption of Agricultural Commodities:</u> Legal work in connection with the administration of Section 32 of the Act of August 24, 1935.....  | 46,420                      | 46,420                      | 18,675          |
| <u>Conservation and Use of Agricultural Land Resources, Department of Agriculture:</u> Legal work in connection with the agricultural conservation program of the Agricultural Adjustment Administration..                      | 141,580                     | 141,580                     | 206,855         |
| <u>Conservation and Use of Agricultural Land Resources, Department of Agriculture</u><br>(Adjustments in Freight Rates for Farm Products): Legal work in connection with the adjustment in freight rates for farm products..... | 14,500                      | 14,500                      | - -             |
| <u>Administration of Sugar Act of 1937, Department of Agriculture:</u> Legal services in connection with the administration of the Sugar Act of 1937.....   | 47,790                      | 47,790                      | 13,943          |





## SUPPLEMENTAL FUNDS - Continued

(1) Direct Allotments - continued

| Projects   | Estimated obligations,<br>1940 | Estimated obligations,<br>1939 | Obligated,<br>1938 |
|--|--------------------------------|--------------------------------|--------------------|
| <u>Administration of Agricultural Adjustment Act of 1938, Department of Agriculture:</u><br>Legal services in connection with the administration of Titles I and III of the Agricultural Adjustment Act of 1938.....   | - -                            | - -                            | \$11,768           |
| <u>Administration of Federal Crop Insurance Act, Department of Agriculture:</u> Legal work in connection with the Federal Crop Insurance Corporation program.....  | \$79,190                       | \$58,690                       | 7,361              |
| <u>Acquisition of Lands for Protection of Watersheds of Navigable Streams (Working fund transferred from Forest Service):</u><br>Legal work in connection with the acquisition of forest lands for protection of watersheds of navigable streams.....            | 100,000                        | 130,000                        | 118,116            |
| <u>Land Utilization and Retirement of Sub-marginal Land, Department of Agriculture:</u><br>Legal work in connection with the land utilization and retirement of sub-marginal land program.....   | 180,000                        | 230,510                        | 71,405             |
| <u>Farm Tenancy, Department of Agriculture, Administrative Expenses:</u> Legal work in connection with the administration of Title I of the Farm Tenant Act.....   | 100,000                        | 100,000                        | 16,098             |
| <u>Liquidation and Management of Resettlement Projects, Department of Agriculture:</u><br>Legal services in connection with section 43 of the Farm Tenant Act relating to resettlement projects and rural rehabilitation projects for resettlement purposes..... | 75,000                         | 75,000                         | - -                |



## SUPPLEMENTAL FUNDS - Continued

(1) Direct Allotments - continued.

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| National Industrial Recovery, Agriculture, Wildlife Refuges: Legal services in connection with the acquisition of lands for migratory bird refuges..... | - -                         | \$27,000                    | \$25,387        |
| Emergency Relief Appropriation Act of 1936:   |                             |                             |                 |
| Legal work in connection with the Farm Security Administration program.....   | - -                         | - -                         | 429,809         |
| Legal work in connection with the land-acquisition projects.....  | - -                         | - -                         | 125,554         |
| Emergency Relief Appropriation Act of 1938:   |                             |                             |                 |
| Legal work in connection with the rural rehabilitation program (Farm Security Administration).....  | - -                         | 377,885                     | - -             |
| Flood Control, General (Transfer from War Department): Legal work in connection with the flood-control program of Department of Agriculture.....        | \$6,859                     | 6,859                       | 4,480           |
| Total, Supplemental Funds (Direct Allotments).....  | 955,639                     | 1,420,534                   | 1,166,236       |

(2) Indirect Allotments

(Financed through other Government agencies)

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| Civilian Conservation Corps (Act of June 28, 1937, and supplemented acts; allotment through War Department): Legal work in connection with claims resulting from Civilian Conservation Corps activities.... | - -                         | \$13,200                    | - -             |
| Total, Supplemental Funds (Indirect Allotments).....  |                             | 13,200                      | - -             |



OFFICE OF INFORMATION

## (a) SALARIES AND EXPENSES

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$379,800      |
| Budget Estimate, 1940 .....  | <u>385,440</u> |
| Increase .....               | <u>5,640</u>   |

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase   |
|---|----------|---------------------|---------------------|------------|
| 1. General administration of Office of Information and of informational work of the Department..... | \$18,773 | \$19,300            | \$19,300            | - - -      |
| 2. Business service, including mails and files .....  | 27,529   | 26,838              | 26,838              | - - -      |
| 3. Publications preparation and control:  |          |                     |                     |            |
| (a) Editorial control and final preparation of manuscripts.....                                     | 31,681   | 32,580              | 32,580              | - - -      |
| (b) Preparation of Yearbook and special reports .....   | 12,358   | 11,980              | 11,980              | - - -      |
| (c) Indexing Department publications.....   | 9,073    | 9,082               | 9,082               | - - -      |
| (d) Preparation of illustrations for publications.....  | 20,078   | 19,460              | 19,460              | - - -      |
| (e) Photographic service for the Department.....  | 34,090   | 34,440              | 35,440              | +1,000 (1) |
| (f) Printing procurement.....   | 14,818   | 14,740              | 14,740              | - - -      |
| Total, Publications preparation and control.....  | 122,098  | 122,282             | 123,282             | +1,000 (1) |
| 4. Distribution of agricultural information directly to the public:                                 |          |                     |                     |            |
| (a) Control of mailing lists for distribution work.....   | 12,065   | 11,700              | 11,700              | - - -      |
| (b) Handling Congressional and general-public requests for agricultural information.....            | 52,894   | (b) 56,480          | 58,880              | +2,400 (2) |
| Total, Distribution of agricultural information directly to the public.....                         | 64,959   | 68,180              | 70,580              | +2,400 (2) |





## PROJECT STATEMENT - Continued.

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase    |
|--|----------|---------------------|---------------------|-------------|
| 5. Preparation and distribution of agricultural information to the press.... | \$30,212 | \$29,620            | \$29,620            | - - -       |
| 6. Preparation and distribution of agricultural information by radio.....    | 32,834   | 31,140              | 31,140              | - - -       |
| 7. Addressing, duplicating, and mailing service for the Department.....      | 81,072   | 82,440              | 84,680              | +\$2,240(3) |
| Unobligated balance.....   | 644      | - - -               | - - -               | - - -       |
|  | (a)      | (b)                 |                     |             |
| Total appropriation.....   | 378,121  | 379,800             | 385,440             | + 5,640     |

(a) Includes \$11,641 allotted from "Soil and Moisture Conservation Operations, Demonstrations, and Information", Soil Conservation Service.

(b) Includes \$100 transferred to Bureau of Standards, Department of Commerce, for research on photographic work.

## INCREASES

The increase of \$5,640 in this item for 1940 consists of:

(1) An increase of \$1,000 to provide for the repair and replacement of a few of the most necessary items of equipment. A large proportion of the equipment of the photographic and drafting section is worn out, obsolete, or in bad repair. The value of this equipment is approximately \$36,000. For a number of years funds for the maintenance, repair, and replacement of equipment have not been adequate.

(2) An increase of \$2,400 to enable the Distribution Section to handle requests for information more quickly and accurately. The Office of Information receives some 4,000 daily requests for information. It fills many of these requests with appropriate bulletins. First, the distribution staff must determine the proper bulletins to send in response to each request, and, secondly, the distribution must be made promptly. To do this requires skill, good judgment, and long experience. At the present time the Office is operating under distinct handicaps. Because positions in the distribution unit are classified too low, the turnover of personnel is excessive -- much greater than in other comparable Government units. So requests for information needed quickly are sometimes held up as long as ten days; this includes requests sent by Members of Congress. Furthermore, untrained personnel naturally make many more errors in supplying information. Unless distinct improvements are made in this service the value of many departmental activities to farmers and others will be reduced. It will be impossible to give sufficiently prompt and accurate attention to all requests for information. To overcome these difficulties it is proposed to change the grades of some of the present employees. The following table shows, by grades, the present positions and those proposed:



| <u>Present Clerical Staff</u> |                        | <u>Proposed Clerical Staff</u> |                        | <u>Increase or<br/>Decrease in Cost</u> |                 |
|-------------------------------|------------------------|--------------------------------|------------------------|---|-----------------|
| <u>No. of<br/>Persons</u>     | <u>Annual<br/>Cost</u> | <u>No. of<br/>Persons</u>      | <u>Annual<br/>Cost</u> |   |                 |
| CAF-2                         | 8                      | \$11,640                       | 2                      | \$2,880                                 | - \$8,760       |
| CAF-3                         | 9                      | 14,760                         | 6                      | 9,720                                   | - 5,040         |
| CAF-4                         | <u>3</u>               | <u>5,400</u>                   | <u>12</u>              | <u>21,600</u>                           | + <u>16,200</u> |
| Totals                        | 20                     | 31,800                         | 20                     | 34,200                                  | + 2,400         |

These changes affect only the clerical group handling requests for information. At present there are in distribution work 9 employees in addition to the ones shown above. Their salaries amount to \$17,840 a year. This added to the present cost of the above group (\$31,800) makes a total salary cost of \$49,640 for distribution work under the present arrangement. Under the reclassification plan recommended, while the cost would be increased by only \$2,400, the efficiency of the service would be greatly increased.

(3) An increase of \$2,240 to provide for a few of the most essential machinery repairs to enable the duplicating plant to meet the increased needs of bureaus and offices of the Department. New Department activities have increased the volume of work of the Department's central addressing, duplicating, and mailing plant. For several years it has been necessary to speed up machinery and to operate some machines two shifts daily. This has caused unusual wear and tear on the equipment, which has a total value of more than \$95,000. Funds for major repairs and replacements have been very inadequate. Even though an expert repairman has rendered invaluable service in maintaining the equipment, many of the machines are so badly worn that the purchase of parts will be necessary to keep them in operation. At times work has been delayed because funds were insufficient to buy repairs.

#### WORK UNDER THIS APPROPRIATION

General.-- The Office of Information is responsible for making available to the public information on the results and progress of the Department's action, research, service, and regulatory programs. Farmers require information on how to utilize Department programs for conservation and proper land use. Scientists of the Department develop information of direct importance to farmers and others. Before this information can be useful to the public it must be brought together and interpreted. The information must be available, prepared, and presented in an accurate, understandable form, and scientific information has to be interpreted to be most useful in connection with the participation of farmers in action programs. The Office of Information is responsible for this work. It relies mainly on publications, the press, and radio. The Office is concerned with all the problems involved in the informational activities of the Department, including the editorial, illustrating, printing, and distribution phases. It also supervises the informational activities of the bureaus and offices and cooperates with 294 radio stations daily, which donate to the Department 120,000 hours of time annually. The Office also prepares or supervises the preparation of approximately 1,700 press releases and 3,000 radio manuscripts annually, and edits about 1,400 technical and popular manuscripts. To maintain an effective policy for agricultural information, the Office of Information cooperates with the State experiment





stations and extension services and correlates Department information with that of other Federal agencies. At present greatest emphasis is being placed on conservation or land-use programs. The development of an Office of Land Use Coordination within the Department is making it possible for the Office of Information, among other things, to give the public correlated information on related conservation activities such as adjustment, marketing, forestry, wildlife, and erosion and flood control, all of which have an influence on the proper and wise use of both public and private lands.

1. General Administration of Office of Information and of Informational Work of Department.-- This Office supervises the correlation of the informational work of the bureaus within the Department, and information activities of the Department with those of the land-grant colleges and State extension services. The Office establishes and controls information policies and procedures. It sees to it that the knowledge of the Department and information on its facilities for meeting current agricultural problems are placed in the hands of farmers and others in practical form, and, to a considerable extent, conveys the needs of farmers to the Secretary and officers of Department agencies in order that programs may be focused on the most critical agricultural problems. The Office supervises and participates in reporting to the public the progress of the new action programs. The Office also determines what types of information are to be disseminated to be of greatest assistance to farmers and others and supervises the integration of knowledge developed by specialists throughout the Department.

2. Business Service, including Mails and Files.-- This unit handles the business, financial, purchasing, personnel, and legal affairs of the Office of Information. It includes the central files section which handles a large volume of letters, vises outgoing mail, and maintains subject-matter files and a library for the Office of Information.

3. Publications Preparation and Control.-- The Office of Information supervises the preparation of many Department publications. It also consults with specialists and helps choose what shall be prepared for printing and determines the form of publication and the quantity. Under available funds it is impossible to publish all significant material developed in the Department. If this could be done there would be issued approximately 3,000 new circulars and bulletins of various types each year. Because of the limitation of funds for the publication of Department material, the Office of Information selects and arranges for the publication of a total of approximately 1,400 manuscripts, including very technical material covering basic economic and scientific research, as well as popular manuscripts carrying practical advice to farmers and others. The Office handles the editing, indexing, illustrating, and printing work involved. The Office also prepares the Yearbook of Agriculture and the Secretary's annual report to the President and Congress.

4. Distribution of Agricultural Information Directly to the Public.-- Each working day the Office of Information receives several thousand requests for information. It handles many of these by sending appropriate bulletins. First, the distribution staff must determine the proper bulletins to send in response to each request, and, secondly, the distribution must be made promptly. The use of Department publications has been found the cheapest and most ef-



fective way to get agricultural science into practice and to place economic information into the hands of interested persons. The work of this division requires skill and experience, for the request for information must be met from a supply of bulletins on many different subjects. In addition, the division distributes publications regularly to a very small group of cooperating scientists, libraries, and county agents, who receive selected bulletins direct through the use of classified mailing lists. Specific requests received by Members of Congress are also handled by the division. The cost to the Government for printing and mailing popular bulletins is slightly more than 1-1/2 cents each. If a special letter had to be prepared in response to requests, the cost would average about 30 cents each.

5. Preparation and Distribution of Agricultural Information to the Press.-- Information arising from the activities of the Department is distributed by the Office of Information directly to the press, including newspapers, farm papers, trade journals, technical publications, press associations, special writers, and correspondents.

In recent years as the activities of the Department have been enlarged and new agencies have become a part of the Department, and as new legislation providing for flood control, water utilization, cotton classing, protection for consumers of foods, drugs, and cosmetics, and other mandates of Congress have added to the Department's responsibilities, the volume of work carried by the Press Service has greatly increased. The Office of Information cooperates with newspapers and other periodicals for the purpose of making useful information available to farmers, homemakers, and others. Supplying matter for the use of the newspapers and magazines is one important and inexpensive method of making available to large numbers of interested persons information on the findings of the Department. The output of press releases amounts to about 1,700 each year in addition to special articles requiring considerable special work in gathering and preparing information.

6. Preparation and Distribution of Agricultural Information by Radio.-- The Office of Information, in cooperation with radio networks and stations, broadcasts to farmers, homemakers, and others information on the various activities of the Department. Radio makes it possible to disseminate quickly information having great but ephemeral value. Much of the information developed by the Department must be distributed rapidly in order to insure its full usefulness to farmers and others. The Office of Information uses radio facilities made available by the broadcasters daily to transmit particularly facts on the progress of action programs, economic and related information, and announcements. It prepares and produces daily, except Saturday and Sunday, 15- to 30-minute information programs, broadcast as one feature of the National Farm and Home Hour, presented by the National Broadcasting Company and transmitted by 93 associated stations in the Eastern, Central, Mountain, and Pacific time zones. In addition, 15 minutes daily of information for farmers and homemakers is prepared and produced by a field office in San Francisco and presented by the National Broadcasting Company and a network of 11 stations.

The Office prepares and sends to 294 independent stations daily, except Sunday, a 7-minute program giving useful information for farmers. The Office likewise sends to 256 stations a daily 7-minute program of information to consumers and homemakers. The Department does not pay for radio time.





7. Addressing, Duplicating, and Mailing Service for the Department.--

For purposes of economy and efficiency, the Office of Information maintains a plant to handle the addressing, duplicating, and mailing work for most of the bureaus and offices of the Department. Duplication of material is essential for rapid distribution of administrative matters, radio and press releases, market reports, progress reports, and other information too ephemeral in nature to justify printing.



## (b) PRINTING AND BINDING

|                              |                  |
|------------------------------|------------------|
| Appropriation Act, 1939..... | \$1,094,970      |
| Budget Estimate, 1940.....   | <u>1,159,970</u> |
| Increase .....               | <u>65,000</u>    |

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase   |
|---|----------|---------------------|---------------------|------------|
| 1. Job work and binding, expenditures for printing:   |          |                     |                     |            |
| (a) Binding.....  | \$41,237 | \$30,400            | \$38,400            |            |
| (b) Emergency field printing.....   | 4,494    | 8,700               | 8,700               |            |
| (c) Job work.....   | 289,347  | 304,300             | 317,100             |            |
| (d) Letterheads.....  | 9,884    | 15,600              | 15,600              |            |
| Total.....  | 344,962  | 359,000             | 379,800             | +20,800(1) |
| 2. Reports, periodicals, and other regulatory, service, and administrative publications, expenditures for printing: |          |                     |                     |            |
| (a) Agricultural Situation.....   | 10,601   | 17,000              | 17,000              |            |
| (b) Annual reports.....   | 11,560   | 11,900              | 11,900              |            |
| (c) Climatological Data.....  | 10,088   | 11,800              | 11,800              |            |
| (d) Congressional Documents.....  | 3,048    | 3,100               | 3,300               |            |
| (e) Crops and Markets.....  | 14,997   | 17,000              | 17,000              |            |
| (f) Experiment Station Record.....  | 18,380   | 19,000              | 19,000              |            |
| (g) Extension Service Review.....   | 6,000    | 6,000               | 6,000               |            |
| (h) Farmers' Bulletin Lists.....  | 8,533    | 8,050               | 8,750               |            |
| (i) Fire Control Notes.....   | 500      | 2,000               | 2,000               |            |
| (j) Forest Folders.....   | 7,165    | 7,000               | 8,000               |            |
| (k) Indexes.....  | 21,022   | 5,600               | 6,100               |            |
| (l) Inventory of Seeds and Plants Imported.....   | 615      | 1,600               | 1,800               |            |
| (m) Journal of Agricultural Research.....   | 6,218    | 5,850               | 5,850               |            |
| (n) Monthly List of Publications ..   | 1,135    | 900                 | 1,000               |            |
| (o) Monthly Weather Review.....   | 10,973   | 10,500              | 10,500              |            |
| (p) Monthly Weather Review Separates.....   | 3,383    | 1,300               | 1,600               |            |
| (q) Service and Regulatory Announcements.....   | 22,767   | 28,400              | 31,400              |            |
| (r) Soil Conservation Magazine.....   | 8,500    | 8,500               | 8,500               |            |
| (s) Unnumbered Publications.....  | 29,247   | 29,700              | 34,700              |            |
| (s-1) Daily River Stages.....   | 5,465    | 6,500               | 7,500               |            |
| (t) Yearbook of Agriculture.....  | 20,000   | 20,700              | 21,700              |            |
| (t-1) Statistical Report.....   | 12,260   | 12,000              | 13,200              |            |
| Total.....  | 232,457  | 234,400             | 248,600             | +14,200(1) |

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## PROJECT STATEMENT - Continued

| Projects   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase   |
|--|-----------|---------------------|---------------------|------------|
| 3. Research and technical bulletins, expenditures for printing:                  |           |                     |                     |            |
| (a) Circulars.....   | \$ 25,158 | \$25,980            | \$27,980            |            |
| (b) Erosion Reports.....   | 12,966    | 55,000              | 55,000              |            |
| (c) Experiment Station Bulletins and Reports.....                                | 1,567     | 2,300               | 2,300               |            |
| (d) Journal of Agricultural Research Separates.....                              | 17,847    | 19,000              | 20,400              |            |
| (e) Reprints of Former Series and of Outside Articles.....                       | 3,963     | 2,440               | 2,440               |            |
| (f) Soil Surveys.....  | 95,559    | 90,000              | 90,000              |            |
| (g) Statistical Bulletins.....   | 3,864     | 8,500               | 12,500              |            |
| (h) Technical Bulletins.....   | 41,817    | 57,550              | 65,550              |            |
| Total.....   | 202,741   | 260,770             | 276,170             | +15,400(1) |
| 4. Farmers' Bulletins and other popular publications, expenditures for printing: |           |                     |                     |            |
| (a) Clip Sheet.....  | 2,950     | 3,100               | 3,100               |            |
| (b) Farmers' Bulletins - New.....  | 28,415    | 35,300              | 38,500              |            |
| (c) Farmers' Bulletins - Reprints and Revisions.....                             | 135,726   | 135,700             | 142,700             |            |
| (d) Leaflets - New.....  | 5,768     | 5,600               | 6,000               |            |
| (e) Leaflets - Reprints and Revisions.....                                       | 9,336     | 9,200               | 9,400               |            |
| (f) Miscellaneous Publications.....  | 121,471   | 46,500              | 49,600              |            |
| (g) Posters.....   | 5,687     | 4,300               | 4,900               |            |
| (h) Yearbook and Statistical Separates.....                                      | 5,457     | 1,100               | 1,200               |            |
| Total.....   | 314,810   | 240,800             | 255,400             | +14,600(1) |
| (a)  |           |                     |                     |            |
| Total appropriation.....   | 1,094,970 | 1,094,970           | 1,159,970           | +65,000(1) |

(a) 1938 obligations include allotments of \$207,320 from Soil Conservation Service funds, as follows: \$5,110 from "General Administrative Expenses", \$6,509 from "Soil and Moisture Conservation and Land-Use Investigations", and \$195,701 from "Soil and Moisture Conservation Operations, Demonstrations, and Information."





## INCREASE

(1) An increase of \$65,000 is recommended in this item for 1940, consisting of \$20,800 under the project for "Job work and binding", \$14,200 under "Reports, periodicals, and other regulatory, service, and administrative publications", \$15,400 under "Research and technical bulletins", and \$14,600 under "Farmers' bulletins and other popular publications", to offset higher costs for printing Department matter.

In October 1937 the Government Printing Office put into effect a new cost-accounting system to make charges to the various departments more accurately reflect the cost of doing each job. Under this new system the charges are higher for certain jobs, such as those involving a great deal of composition and short press runs; and the charges are lower for jobs of long runs. Most of the Department of Agriculture's printing and binding is of the types which under the new accounting system involve the more costly operations. As a result it is estimated that the Department of Agriculture has been paying approximately 10 percent more for printing than before the new accounting system was set up. Under the 1940 estimates, however, an increase of only about 6 percent, or \$65,000, is requested to offset the higher costs and thus to enable the Department to obtain nearly the same amount of printing as under the former accounting system.

## WORK UNDER THIS APPROPRIATION

General. -- The work under this appropriation consists of publishing the results of the scientific and economic research work of the Department; printing publications required by law or otherwise essential in the regulatory, service, and conservation programs; printing forms, letterheads, certificates, and other material classified as job work. In 1932, the funds available for the printing of the branches of the Department then in existence stood at \$1,000,000, a fairly adequate amount. The following year they were decreased to \$660,000. Since then, the fund has increased to \$887,650. The printing funds for these branches thus are now smaller than in 1932, though the work necessitating printing assigned to these branches has increased. The printing appropriation to the Office of Information for the current fiscal year includes, besides the \$887,650 for the older branches of the Department, \$207,320 added on account of the printing program required for the work of the Soil Conservation Service. The total is \$1,094,970.

The printing and binding work of the Department is classified under four headings:

- (1) Job work and binding.
- (2) Administrative publications.
- (3) Research and technical publications.
- (4) Popular publications.



Material in the first two groups is essential to efficient administration within the Department itself. Publications falling within the third group are vital to research scientists, teachers, and others. Included in this third group are the soil surveys which furnish basic information on soil types, series, and phases essential to other branches of agricultural research and in all agricultural planning work; and soil-erosion reports, including maps of representative watershed areas and recommendations for land-use practices which, if adopted, will control erosion. The popular publications (group 4) are used to disseminate practical knowledge to farmers, transporters, business men, housewives, processors, and the general public.

### 1. Job Work and Binding

(a) Binding. -- Most of the binding work of the Department is done for the central library, the Weather Bureau library, and the Office of Experiment Stations library. There is now an excessive accumulation of unbound periodicals, serials, reports, and proceedings. The cost of binding has increased materially, since it is necessary to keep this material reasonably current if the libraries are to give good service.

(b) Emergency Field Printing. -- Forms, tags, certificates, and other small printing jobs are often needed quickly in field offices of the Department, both in the United States and abroad, and so cannot be printed in the District of Columbia. Therefore, the Joint Committee on Printing grants authority to the Department to have the work done in the field to cover emergency needs under this item.

(c and d) Job Work and Letterheads. -- A wide variety of forms, schedules, certificates, etc., are indispensable to carry on the regular activities of the Department. The number of forms printed has been increased by new legislation which provides for activities, such as cotton classing, requiring much additional printing, and also by expansion in previously existing regulatory and service work. The letterheads for the entire Department also fall under this item.

### 2. Reports, Periodicals, and other Regulatory, Service, and Administrative Publications

(a) Agricultural Situation. -- This periodical is used to keep key groups currently informed of the economic situation, including statistics relating to production, movement, consumption, prices, and purchasing power of various commodities. It is sent monthly to crop reporters, a small group of cooperating economists, technical workers, extension agents, and officials of the Agricultural Adjustment Administration.

(b) Annual reports. -- Many of the reports under this item are required by law. They make a permanent record of the work performed during the preceding fiscal year. These reports are considerably below their former size.



(c) Climatological Data. -- In addition to the regular issuance of Climatological Data, Bulletin W (Summaries of Climatological Data) is being published. It comprises 106 separates covering the United States, Alaska, and Hawaii.

(d) Congressional documents. -- Under this item the Department pays for copies of bills, resolutions, reports, Congressional directories, Congressional Records, etc., as Congressional documents.

(e) Crops and Markets. -- This periodical contains statistics and information on crop and livestock estimates (the printing of many of which is mandatory), market information, reports on supplies, stocks, commercial movements, etc.

(f) Experiment Station Record. -- This periodical is the cheapest and most effective means of keeping before all research workers abstracts of the world's scientific and economic literature on agriculture. In this way the Experiment Station Record assists research workers in keeping informed on current scientific developments, with particular reference to the research reports from the State experiment stations, and it effectively promotes the coordination of research itself.

(g) Extension Service Review. -- Current information on extension practices is published in this periodical for distribution monthly throughout the extension organization. The periodical also serves to keep extension agents informed on actions of the Agricultural Adjustment Administration. It reviews new extension developments in the various State institutions. It is especially important at this time because extension officials cooperate in the Soil Conservation and Domestic Allotment and other land-use programs.

(h) Farmers' Bulletin lists. -- These lists are furnished to Members of Congress, extension agents, and farmers to show available publications. Farmers' Bulletins are mailed only upon request.

(i) Fire Control Notes. -- Fire Control Notes is issued bimonthly to keep members of the staff and cooperators of the Forest Service informed on developments in the techniques of forest-fire control.

(j) Forest folders. -- Folders are used to induce the millions of visitors to use the national forests properly in order to reduce the fire hazard. They are also being used by members of the Civilian Conservation Corps as a source of information on forestry purposes and practices.

(k) Indexes. -- Indexes become increasingly important as Department publications increase in number and scope.

(l) Inventory of seeds and plants imported. -- Importations of seeds and plants are becoming more important because of the Department's search for erosion and drought-resistant vegetation. These inventories contain a record of new and little-known seeds and plants procured mostly from abroad for the use of the Department, State experiment stations, and experimenters in appropriate locations throughout the United States.





(m) Journal of Agricultural Research. -- The Journal of Agricultural Research carries the most technical reports of pure research performed in the Department and the State experiment stations. Its distribution is limited rigidly to selected libraries.

(n) Monthly List of Publications. -- For economy the Department does not list those who ask to receive all printed publications. The list of new publications is mailed instead. Scientists, economists, foreign and domestic libraries, and teachers make up the bulk of the mailing list.

(o) and (p) Monthly Weather Review and separates. -- Reports of research by the staff of the Weather Bureau are published with records of weather observations in the United States, including climatological charts. This periodical also deals with floods, storms, earthquakes, solar radiation, etc. It is distributed to Weather Bureau field stations, Signal Corps, meteorological and naval air stations, and libraries. For purposes of economy, the separates (each covering a single subject or group of statistics) are distributed separately. This, the only meteorological publication of its kind in the country, is the textbook for weather officials. It is exchanged with foreign weather services. The general public can obtain copies only by purchase.

(q) Service and Regulatory Announcements. -- These consist of Bureau of Animal Industry orders, notices of judgment under the Food and Drugs Act, notices of quarantine, and other announcements of a mandatory character, which are essential in carrying forward the Department's regulatory programs.

(r) Soil Conservation Magazine. -- This periodical, issued monthly and sent to a selected list of staff members of the Department and associated agencies, (1) conveys administrative information to members of the field staff of the Soil Conservation Service; (2) equips specialists of the Service and cooperating agencies with current technical and scientific knowledge in soil conservation and related fields; (3) serves as a clearing house of ideas and experiences; (4) provides a valuable archive of conservation history; and (5) serves as a reference work of authentic and practical information concerning a comprehensive action program which involves the application of many new technical developments and improvements.

(s) Unnumbered publications. -- This series is used for various bulletins which cannot logically be classified in the other Department series. Examples include such publications as "Science Service Agriculture," "Topsoil, Its Preservation," and "Soil and Water in the Northern Great Plains."

(s-1) Daily River Stages. -- This publication includes daily river stages as recorded at approximately 550 gaging stations located on all of the principal streams in the United States, as well as a condensed description of each gaging station. The purpose of the publication is the dissemination in convenient form of annual hydrologic data for the use of engineers and others, both within and without the Federal service, in connection with the study of floods, streamflow, and run-off, with special relation to river stage





forecasts, flood warnings, flood control, irrigation, drainage, and hydro-electric problems.

(t) Yearbook of Agriculture. -- The Yearbook, which is an annual publication required by law, presents information on the new developments of agriculture. The 1936 and 1937 Yearbooks consisted of a comprehensive treatment of the subject of plant and animal breeding. The 1938 Yearbook deals comprehensively with the subject of soils and soil conservation. The bulk of the Department's distribution is to its own collaborators, and the Congressional distribution (paid for from Congressional funds) is to farmers.

(t-1) Statistical Report. -- The statistics previously incorporated in the Yearbook of Agriculture are now published in a separate volume for purposes of economy. Probably not more than 10 percent of those who receive the Yearbook are interested in the detailed statistics. On the other hand, many persons have a distinct need for additional statistics which were not previously published in the Yearbook.

### 3. Research and Technical Bulletins

(a) Circulars. -- Circulars report in semitechnical form current results of the manifold research programs of the Department. Some examples are "Selecting Fertilizers" and "Marketing the Late Crop of Potatoes."

(b) Erosion reports. -- Soil-erosion reconnaissance reports are used by soil conservation districts, county planning agencies, extension services, and other organizations in developing general conservation plans. Detailed soil-erosion reports are used primarily by individual farmers in making new farm-management plans for the control of erosion on their own farms. They are of 2 general types: (1) Erosion reconnaissance reports, accompanied by lithographed maps with a scale usually of 1 or 1/2 inch to the mile, to give a general picture of erosion conditions on comparatively large areas. These publications, including both text and maps, are used for general land-use planning in which erosion conditions must be considered. (2) Reports giving detailed information applicable to individual farms, including degree of erosion, slope, type of vegetative cover, and other factors which the farmer and conservation workers must consider in the control of erosion. The reports will be used for the purpose of explaining the use of diagrammatic maps, usually at a scale of 4 inches to the mile, reproduced by an inexpensive duplicating process. They will contain information designed for use by the individual farmer; soil conservation districts, now authorized by law in 25 States; extension service workers; county agents; and many others interested in laying out detailed farm-management plans to control erosion on each field. The printed text will give correlated summaries of physical factors of the land and recommendations as to what may be done by the farmer to conserve the soil under each of the conditions depicted by the duplicated maps. Duplication will be used for reproducing the maps because (a) it is by far the most economical method, and (b) some of the factors shown, such as vegetative cover, are apt to change rapidly as farmers plan their farms in accordance with the recommendations. The



cost for duplicating the maps is less than 40 percent of the cost of lithographing.

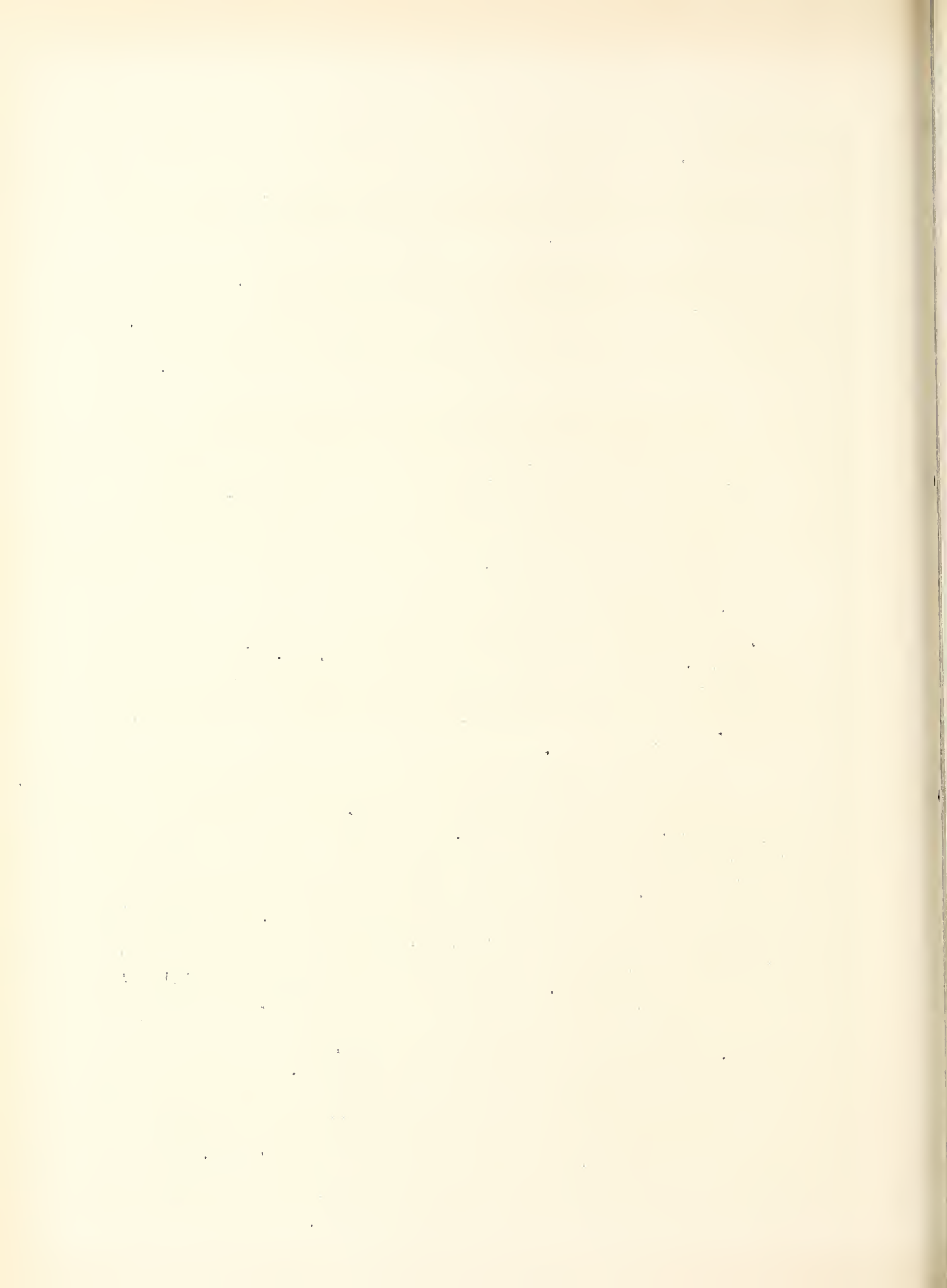
(c) Experiment Station bulletins and reports. -- This series is used to report the results of work done at the insular research stations and includes also the annual reports of the insular stations.

(d) Journal of Agricultural Research separates. -- As the bound copies of the Journal itself are sent to a very restricted mailing list, separates are printed for scientists who request technical information on the specific subject covered. Only libraries and foreign institutions on an exchange list receive the Journal itself free of charge.

(e) Reprints of former series and of outside articles. -- A number of series, such as Department Bulletins, Department Circulars, and Miscellaneous Circulars, have been superseded by other series. However, much scientific information contained in the older publications is necessary in carrying on current work and can be reprinted for less than it would cost to print new manuscripts. The Department also sometimes buys 100 to 200 copies of reprints of current technical material prepared by Department scientists but printed in nongovernmental publications.

(f) Soil surveys. -- The soil survey publications are mandatory by law. In 1930 the Department paid approximately \$75,000 for printing soil surveys. In 1931 the expenditure was \$97,000. In 1932 and 1933 the normal expenditures would have been approximately \$100,000 each year, but to effect economies the Department spent only slightly more than \$40,000 each year. Since then the fund available for publishing soil surveys has been increased to \$90,000.

Soil surveys serve many purposes in research and extension programs. They are a permanent record of soil factors, knowledge of which is essential as a guide to farmers and Federal, State, and private agencies interested in the adaptabilities and values of various lands. For reasons of economy the soil surveys are published on the smallest scale consistent with convenience in filing, ease of handling, and showing needed information over as large an area as possible on a single sheet. Usually this can be done at a scale of 1 inch to the mile, which keeps the cost as low as possible and shows a large area on a single sheet. This is necessary for such purposes as rural zoning, county planning, and other activities which involve a large number of farms or large area of land. On such a map it is convenient to compare various portions of a large area on one complete base map. Where soils, topography, and other factors are rather uniform over extensive areas a smaller scale may be used. The survey maps and textual information accompanying them are becoming increasingly useful in connection with the coordination of broad land-use programs of the Department and cooperating agencies and are extensively used for program planning by the Extension Service, State Planning Boards, State colleges and experiment stations, Federal and private credit agencies, and by fertilizer companies and many other agencies whose work is affected by the general distribution of various land types.





(g) Statistical bulletins. -- All statistical publications, including those on futures trading -- the printing of many of which is mandatory -- are contained in this series. Some examples are "Grade, Staple Length, and Tenderability of Cotton in the United States," "Stumpage and Log Prices," and "Annual Report on Tobacco Statistics."

(h) Technical bulletins. -- This is one of the most important series of publications issued by the Department. Technical bulletins form a permanent record of research results for Department scientists, cooperating institutions, and scientists of the experiment stations. The Department faces the condition of achieving valuable research results without having the opportunity of giving these results to the public in a usable form. Even though every effort has been made to reduce the length of each manuscript and the number of copies printed of each technical bulletin in order to conserve printing funds, many important research manuscripts have not been published. If a research report is to be valuable, it must be complete; too great a reduction destroys its usefulness. Consequently, under present conditions, it is often necessary to complete the preparation and editing of technical manuscripts and then to hold them until funds for their printing are available.

#### 4. Farmers' Bulletins and Other Popular Publications

(a) Clip sheet. -- The Clip Sheet, sent weekly to 3,500 newspapers, contains brief material on improved farm practices, economic adjustments, conservation farming practices, and accounts of Department activities.

(b, c, d, and e) Farmers' Bulletins and Leaflets - new and reprints -- Farmers' Bulletins are published to place useful information in the hands of farmers. They constitute one of the most effective means of putting science into practice. Four-fifths of all Farmers' Bulletins are distributed by Members of Congress. The Department and most Members of Congress mail Farmers' Bulletins only upon specific request. The Leaflets are merely 4- and 8-page Farmers' Bulletins. Farmers' Bulletins cost only about 1-1/2 cents a copy. If they did no more than enable the Department to answer correspondence expeditiously and efficiently, they would be worth far more than they cost, as the cost of preparing and mailing a special letter in response to requests for information averages about 30 cents.

(f) Miscellaneous publications. -- Nontechnical material for specialized distribution is contained in the miscellaneous publications. Among them are some conservation publications carrying practical information to the public and such publications as "To Hold This Soil" and "What Is Soil Erosion?" etc. The material is largely nontechnical and the distribution is always specialized.





(g) Posters. -- Posters are used sparingly by the Department and then only in connection with special campaigns such as those involving the elimination of livestock diseases, forest fire protection, and various conservation programs.

(h) Yearbook and Statistical separates. -- The Yearbook and the Statistical report contain a number of separate, specialized articles and tables comprising related parts in the complete treatment of a broad subject such as genetics or soils, or income and production. Separates are printed in very small volume for use in answering correspondence.

### SUPPLEMENTAL FUNDS

| Projects   | Obligated,<br>1938 | Estimated<br>obligations,<br>1939 | Estimated<br>obligations,<br>1940 |
|--|--------------------|-----------------------------------|-----------------------------------|
| <u>Conservation and Use of Agricultural Land Resources, Department of Agriculture;</u> For informational work in connection with agricultural conservation programs . . . , . . .                    | \$12,104           | \$10,680                          | \$10,680                          |
| <u>Emergency Relief Appropriation Act of 1936;</u> For standard and departmental forms for use in connection with emergency relief programs of the Department, . . . , . . . , . . . , . . . , . . . | 3,000              | - - -                             | - - -                             |
| <u>Emergency Relief Appropriation Act of 1938;</u> For standard and departmental forms for use in connection with emergency relief programs of the Department, . . . , . . . , . . . , . . . , . . . | - - -              | 15,000                            | - - -                             |
| Total . . . , . . . , . . . , . . . , . . .  | 15,104             | 25,680                            | 10,680                            |



LIBRARY

## SALARIES AND EXPENSES

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$105,420      |
| Budget Estimate, 1940.....   | <u>109,220</u> |
| Increase.....                | <u>3,800</u>   |

## PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Esti-<br>mated) | 1940<br>(Esti-<br>mated) | Increase    |
|--|----------|--------------------------|--------------------------|-------------|
| 1. General administration and business service.....  | \$17,686 | \$18,510                 | \$18,510                 | -----       |
| 2. Acquisition of publications by purchase, gift, and exchange, and preparation of material for binding..... | 49,600   | 48,800                   | 48,800                   | -----       |
| 3. Classifying, cataloging, and indexing of publications.....  | 20,765   | 20,495                   | 22,295                   | +\$1,800(1) |
| 4. Circulation, reference, and bibliographical service.....  | 16,869   | 17,615                   | 19,615                   | +\$2,000(2) |
| Unobligated balance.....   | 500      | -----                    | -----                    | -----       |
| Total appropriation.....   | 105,420  | 105,420                  | 109,220                  | +\$3,800    |

## INCREASES

The increase of \$3,800 in this item for 1940 consists of:

(1) \$1,800 for an additional library assistant, to assist in the cataloging and filing of catalog cards. The catalog is the most important record of the Library and unless it can be kept up to date, all of the work of the Library suffers. The present cataloging staff is not sufficient to keep the work current.

Statistics for the 10-year period 1929-1938 show that the total accessions to the Library have increased 27 percent in that period, but there has been an increase of only 10 percent in the number of catalogers. In other words, one cataloger has been added during the 10-year period. The number of uncataloged items on hand in 1929 was 2,133, as compared with 6,759 in 1938, an increase of 216 percent. To catalog the uncataloged material now on hand it is estimated that it would take the full time of the present cataloging force for a period of three months, exclusive of any work on current incoming material.

1. The first part of the paper is devoted to a general  
 introduction of the subject and a review of the literature.  
 2. The second part is devoted to a detailed study of the  
 various aspects of the problem.

3. The third part is devoted to a study of the  
 various aspects of the problem.

4. The fourth part is devoted to a study of the  
 various aspects of the problem.

5. The fifth part is devoted to a study of the  
 various aspects of the problem.

6. The sixth part is devoted to a study of the  
 various aspects of the problem.

7. The seventh part is devoted to a study of the  
 various aspects of the problem.

8. The eighth part is devoted to a study of the  
 various aspects of the problem.

9. The ninth part is devoted to a study of the  
 various aspects of the problem.

(2) \$2,000 for an additional assistant in the Readers' Division to help in meeting the increased demands upon this Division. Due to the bringing together of many offices of the Department in the South Building, there are many more readers who come to the Library, either to get particular books or to obtain information on some special subject. The needed immediate attention to these readers requires more help in the Readers' Division. Furthermore, the National Agricultural Research Center of the Department at Beltsville, Md., and the new activities which have been added to the Department, as well as various new Government agencies outside the Department, have made many additional demands upon the Library. The Readers' Division has had no increase in the staff in the past eight years. During this period the increase in the number of books charged at the Loan Desk was 36 percent; the increase in the number of books borrowed from other libraries was 47 percent; and the number of books lent outside Washington increased by 123 percent. Additional help is urgently needed to meet this situation.

#### CHANGE IN LANGUAGE

Minor changes are recommended in the language of this item to make clear that the newspaper fund is not intended to be charged with the payment of dues for library memberships in societies and associations and that such dues, when approved by the Secretary of Agriculture, are to be paid from other Library funds. For several years the newspaper allotment has been insufficient for the purchase of newspapers alone. The amount paid for membership dues from the newspaper allotment during the fiscal year 1938 was \$140.

#### WORK UNDER THIS APPROPRIATION

General.-- The Library is one of the basic units in the research, extension, and regulatory work of the Department and the State agricultural agencies. It acquires, records and makes readily available for reference and circulation, through its catalogs, indexes, and bibliographical lists, the important books, periodicals, and other publications containing information upon the subjects under investigation by the Department. With its branches in the various bureaus, it contains approximately 285,000 volumes, probably the most extensive agricultural collection existing in any country. Its catalogs and special indexes, comprising more than 2,000,000 cards, furnish an invaluable key to the literature of agriculture and enable the Library to give outstanding service along bibliographical lines in the field of agriculture and the related sciences. Its services are used not only by the Department but also by other Government offices in Washington and by investigators throughout the country. Its aim in general is to serve as the national agricultural library. The appropriation of the Library is used for four main purposes, as follows:

1. General administration and business service.--The administrative and business office handles the finances, correspondence, and personnel matters. It also is charged with the ordering of books, periodicals, and newspapers, the purchase of equipment and supplies, and the upkeep of the Library quarters.





2. Acquisition of publications by purchase, gift and exchange, and preparation of material for binding.-- The Library acquires through purchase the scientific, technical, and economic books and periodicals needed in the work of the Department, including the common and very frequently used reference books such as dictionaries, handbooks, directories, and atlases, for filing in the various offices. In addition, it collects by gift and exchange the publications of societies and institutions, both American and foreign, bearing upon agriculture and the related sciences of interest in the activities of the Department.

3. Classifying, cataloging and indexing of publications.-- The Library maintains author and subject catalogs of the book resources of the Department and also special indexes on various subjects, comprising in all two million cards. Through these catalogs, special indexes, and current lists of accessions, the collections are made readily available.

4. Circulation, reference and bibliographical work.-- The Library circulates books and periodicals which are needed by Department workers in their work, especially in research, and assists them in gathering references on scientific and economic subjects and problems which are being investigated. It supplies reference material and bibliographical information needed in answering the various inquiries addressed to the Department and assists the State agricultural colleges and experiment stations and other scientific institutions through the loan of its books. In general, it endeavors to perform the functions of a national agricultural library and of a clearing house for bibliographical information relating to the literature of agriculture in all its phases.

#### SUPPLEMENTAL FUNDS

| Project  | Estimated obligations,<br>1940 | Estimated obligations,<br>1939 | Obligated,<br>1938 |
|--|--------------------------------|--------------------------------|--------------------|
| <u>Conservation and Use of Agricultural Land Resources, Department of Agriculture:</u> For reference work and circulation of books and periodicals.. | -----                          | -----                          | \$3,240            |



The first part of the paper discusses the importance of maintaining accurate records of all transactions. It is essential for the business to have a clear and concise record of all income and expenses. This will allow the business to track its financial performance over time and identify areas for improvement. The second part of the paper discusses the importance of maintaining accurate records of all assets and liabilities. This will allow the business to track its net worth over time and identify areas for improvement. The third part of the paper discusses the importance of maintaining accurate records of all debts and obligations. This will allow the business to track its financial obligations over time and identify areas for improvement. The fourth part of the paper discusses the importance of maintaining accurate records of all taxes and other legal obligations. This will allow the business to track its financial obligations over time and identify areas for improvement. The fifth part of the paper discusses the importance of maintaining accurate records of all other financial information. This will allow the business to track its financial performance over time and identify areas for improvement.

## OFFICE OF EXPERIMENT STATIONS

(a) PAYMENTS TO STATES, HAWAII, ALASKA,  
AND PUERTO RICO FOR AGRICULTURAL EXPERIMENT STATIONS

Appropriation Act, 1939. . . . . \$6,541,250  
 Budget Estimate, 1940. . . . . 6,850,000  
 Increase . . . . . 308,750

## PROJECT STATEMENT

| Projects   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase     |
|--|-----------|---------------------|---------------------|--------------|
| 1. Hatch Act (Act March 2, 1887) ..                      | \$720,000 | \$720,000           | \$720,000           | - - -        |
| 2. Adams Act (Act March 16, 1906) ..                     | 720,000   | 720,000             | 720,000             | - - -        |
| 3. Purnell Act (Act February 24, 1925) .....             | 2,880,000 | 2,880,000           | 2,880,000           | - - -        |
| 4. Hawaii Station Act (Act May 16, 1928) .....           | 50,000    | 55,000              | 60,000              | + \$5,000(1) |
| 5. Alaska Station Act (Act February 23, 1929) .....      | 15,000    | 15,000              | 15,000              | - - -        |
| 6. Alaska Station Act (Act June 20, 1936) .....          | 7,500     | 8,750               | 10,000              | + 1,250(2)   |
| 7. Puerto Rico Station Act (Act March 4, 1931) .....     | 40,000    | 42,500              | 45,000              | + 2,500(3)   |
| 8. Bankhead-Jones Act, Title I (Act June 29, 1935) ..... | 1,800,000 | 2,100,000           | 2,400,000           | + 300,000(4) |
| Total appropriation .....                                | 6,232,500 | 6,541,250           | 6,850,000           | + 308,750    |

## INCREASES

The increase of \$308,750 in this item for 1940 consists of:

(1) An increase of \$5,000 for payments to the Hawaii Agricultural Experiment Station, which is authorized by the Hawaii Station Act of May 16, 1928, for investigations to establish and maintain a permanent and efficient agricultural industry in the Hawaiian Islands. This distant section of the United States is far from being agriculturally self-sufficient. The Islands are dependent upon imports for an adequate food supply for the population, a situation which would be of more than local concern in case of a national emergency in which the Islands became isolated. Support of agricultural research in Hawaii to the fullest extent possible is fundamental to the solution of this problem.

1. The first part of the paper is devoted to a general discussion of the problem.

2. The second part is devoted to a detailed study of the case of a single particle.

3. The third part is devoted to a study of the case of a system of particles.

4. The fourth part is devoted to a study of the case of a system of particles.

5. The fifth part is devoted to a study of the case of a system of particles.

6. The sixth part is devoted to a study of the case of a system of particles.

7. The seventh part is devoted to a study of the case of a system of particles.

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10. The tenth part is devoted to a study of the case of a system of particles.

11. The eleventh part is devoted to a study of the case of a system of particles.

12. The twelfth part is devoted to a study of the case of a system of particles.

13. The thirteenth part is devoted to a study of the case of a system of particles.

14. The fourteenth part is devoted to a study of the case of a system of particles.

15. The fifteenth part is devoted to a study of the case of a system of particles.

16. The sixteenth part is devoted to a study of the case of a system of particles.

17. The seventeenth part is devoted to a study of the case of a system of particles.

Research already conducted by the Hawaii Agricultural Experiment Station has given promising indications that the Islands could produce their own food supply. These investigations need strengthening to develop and extend the possibilities and their application. Rapid progress is important. The funds totaling \$410,000 for investigations for the benefit of Hawaiian agriculture, originally made available in the fiscal year 1936 from sugar processing tax funds and continued under the appropriation "Payments for Agricultural Adjustment", are now exhausted. With the exhaustion of these funds and the closing of the Federal station, the Territorial station must now assume full responsibility for conducting research to improve Hawaiian agriculture.

The appropriations for the Hawaii Station are authorized by the Act of May 16, 1928, which extends to the Territory of Hawaii the benefits of the Hatch, Adams, and Purnell Acts under which each of the States receives \$90,000 annually for agricultural experiment stations. The Act of 1928 authorized appropriations, beginning with \$15,000 in 1930, and a series of gradually increasing appropriations, under which Hawaii would receive \$60,000 in 1938, \$70,000 in 1939, \$80,000 in 1940, and \$90,000 in 1941. The appropriation was \$50,000 for 1938 and \$55,000 for 1939. \$60,000 is estimated in the Budget for 1940.

Until the close of the fiscal year 1938, the Department maintained a Federal Hawaii Experiment Station at Honolulu. In accordance with a budgetary plan, appropriations to the Federal station were decreased as payments to the Territorial station increased under the Act of 1928. This policy was followed in the fiscal year 1938 by decreasing the appropriation of the Federal station \$10,000, although ~~only one-half~~ of the corresponding increase of \$10,000 to the Territorial station was <sup>not</sup> appropriated.

The Act of May 16, 1928, in authorizing funds for agricultural research for the Territory of Hawaii Experiment Station contemplated that the Territory would provide physical plant facilities from its own funds. The interest of the Territory is evinced by the fact that from the passage of the Act to the end of the fiscal year 1938 the Territory has provided land, buildings, and other physical plant facilities valued at \$103,560 and has made available \$360,000 for the actual investigations, or a total of \$464,305, as compared with \$278,780 which the Territory has received in the same period in Federal grant funds for agricultural research. In other words, the Territory has provided from its funds \$1.66 for each dollar of Federal grant funds received for agricultural research.

(2) An increase of \$1,250 for payments to the Alaska Agricultural Experiment Station, authorized by the Act of June 20, 1936, for research to improve Alaskan agriculture.

A Territory of the United States such as Alaska, situated so far distant from the States and with agricultural problems peculiar to its own special conditions, has especial need of Federal assistance for research. The Alaska Territorial Legislature in 1937 appropriated \$20,000 for the establishment and maintenance of the physical plant for a fur-farming research laboratory in southeast Alaska to be a branch of the Alaska Agricultural Experiment Station. In accordance with the intent and purposes of the Act of June 20, 1936, this appropriation was made by the Territory





to provide facilities for the research to be conducted under the funds provided by the Act.

The Alaska Station Act of June 20, 1936, extends in part the benefits of the Adams and Purnell Acts to the Territory of Alaska. For this purpose it authorizes appropriations as follows: fiscal year 1937, \$5,000; 1938, \$7,500; 1939, \$10,000; 1940, \$12,500, and in succeeding years gradually increasing appropriations until 1947 when the authorized appropriation is \$37,500, which is one-half that provided for each State under the Adams and Purnell Acts. The appropriation for the fiscal year 1939 is \$8,750. The amount estimated for 1940 is \$10,000.

The \$10,000 estimated under the Act of June 20, 1936, and the \$15,000 under the Act of February 23, 1929, would make available to Alaska for the fiscal year 1940 Hatch, Adams, and Purnell Federal grant funds totaling \$25,000, as compared with \$90,000 of these funds which each of the States receives.

(3) An increase of \$2,500 for payments to the Puerto Rico Agricultural Experiment Station, authorized by the Puerto Rico Station Act of March 4, 1931, for research to improve Puerto Rican agriculture.

Puerto Rico has a population of 501 people per square mile, which is greater than that of such generally recognized densely populated countries as Japan, Italy, and Germany. This possession of the United States is almost entirely dependent upon agriculture for its income, but with its dense population there is less than one-half acre of arable land per person. During the decade between 1920 and 1930 the population increased 18.7 percent. Puerto Rico, therefore, with population-pressure problems, with a shortage of arable land, and with agriculture almost the sole source of income, has acute need of research to aid in the solution of its agricultural problems. The realization by the people of Puerto Rico of the importance of agricultural research to the Island is demonstrated by their action in appropriating funds for agricultural research which now exceed \$150,000 a year.

The Puerto Rico Station Act of March 4, 1931, which extends to Puerto Rico the benefits of the Hatch, Adams, and Purnell Acts, authorizes successively increasing appropriations until the amount reaches \$90,000, the same that each State receives under the Hatch, Adams, and Purnell Acts. The Act of March 4, 1931, authorizes an appropriation of \$45,000 for 1939 and \$50,000 for 1940. The appropriation for 1939 was \$42,500. The Budget estimate for 1940 is \$45,000.

(4) An increase of \$300,000 for payments to States, Territories, and Puerto Rico for agricultural research authorized by Title I of the Bankhead-Jones Act of June 29, 1935.

Title I of this Act authorizes appropriations for payments to States, Territories, and Puerto Rico for agricultural research as follows: fiscal year 1936, \$600,000; 1937, \$1,200,000; 1938, \$1,800,000; 1939, \$2,400,000; 1940 and annually thereafter, \$3,000,000. The appropriation for 1939 is \$2,100,000. The Budget estimate for 1940 is \$2,400,000.





The importance of the Federal-grant funds to the State experiment stations is illustrated by the following quotation from a statement published locally by one of the land-grant colleges. This statement may be considered as representative of the situation at the State experiment stations:

"Though on the whole the support provided these agencies has been generous, the immediate problems incident to production and distribution of crops and livestock - problems of crop variety, fertilizer use, insect and disease control, livestock feeding, storage, loss from decay, etc. - have been so many and so pressing that all of these funds have been mortgaged to seek their answers. Indeed, hardly a week goes by but that some responsible individual or some group brings to the attention of the Experiment Station some new problems that they face, or a new angle of some old one, that plainly falls within this general field of regularly organized Agricultural Experiment Station research work. Personnel, facilities, and funds permit taking up some of these problems; they fall short of permitting study of most of them, if the work demanded on the 'regular' projects is to be continued.

"This situation is not at all surprising to those who are acquainted with the problems of agriculture. Neither is it alarming nor is anyone to be blamed. It is probably to be regarded simply as a normal condition in a very diversified industry that is steadily seeking improved products, better methods, and better conditions, generally for those who are engaged in it."

The fact that the people of the States even during the depression and without any matching requirement in order to receive Federal funds made available for support of the Agricultural Experiment Station work over \$2 from State sources to each \$1 from Federal sources for the support of their stations is evidence that the foregoing statement reflects the need and usefulness of such work in the States.

Furthermore, each State represents a part of the national picture as regards the programs of agricultural adjustment, soil conservation and erosion control, resettlement, flood control, and rural electrification. The State experiment station is the one agency to which the majority of farmers go for information and solution of the problems as they affect the individual farm. It would seem logical that the State agency, because of its accumulated facts and experience and local knowledge over a period of 50 years, could not and should not avoid active participation in developing, assembling, and interpreting facts needed in working out sound adjustments for the individual State and its varying conditions under these major national programs. In order to enable the States to render reasonably effective help, the additional funds estimated under Title I of the Bankhead-Jones Act are urgently needed, for such activities as speeding up the soil survey and classification which is basic to most, if not all, programs; in cooperating with the Federal agencies to bring together, appraise, and consolidate all available facts for the improvement of agricultural adjustment programs; in carrying on new observations, experiments, and research to find, if possible, substitute agricultural enterprises where existing enterprises should be changed if soils are going to be preserved; in adjusting livestock and farm management practices where additional pastures and hay crops or other modifications are



clearly needed for soil conservation and land-use adjustment; and in co-operating through consultations and supplying factual data in connection with the national flood control, water resources, and crop-insurance programs.

The need from a National and State standpoint for participation on the part of each State along these lines has resulted in a large portion of the funds under the Bankhead-Jones Act being devoted to these purposes. The need for strengthening work along these lines is apparent from the fact that for the United States as a whole we must deal with approximately 775 type-of-farming areas. Even considering this many type-of-farming areas, State station representatives must adjust and adapt findings for recommendations to fit many additional combinations of soils, markets, transportation, land ownership, ability, and finances of the individual farmers.

Aside from these problems which we might identify in connection with the over-all programs affecting all States, there are many appeals from groups of farmers for additional assistance, including field stations, for study of crop and livestock problems in localities differing from areas within the State where such studies are now under way. In a number of such cases appeals for assistance have been made to the Department of Agriculture. It has seemed to the Department that the initiative in work on these local problems of the State should be assumed by the State, the Federal Government assisting as it has done since 1887 through grant funds under these experiment station acts.

#### CHANGES IN LANGUAGE

It is recommended that the heading of the paragraph covering Title I of the Bankhead-Jones Act be amended to Read as follows:

Title [1,] I, Bankhead-Jones Act:

The change in language proposed here consists of changing Arabic numeral 1 in the title of this subappropriation to Roman numeral I, so that the number of the title of the Bankhead-Jones Act referred to will be in the same form that it is in the Act itself.

#### WORK UNDER THIS APPROPRIATION

General.--The several appropriations under "Payments to States," etc., are made to aid and encourage research on the agricultural industry at the State, Territorial, and Puerto Rican agricultural experiment stations. The funds are warranted direct by the Treasury Department, upon certification by the Secretary of Agriculture, to the institutions designated by the several States, Hawaii, Alaska, and Puerto Rico under the following Acts:

1. The Hatch Act (March 2, 1887) authorizes \$15,000 per annum to each State for agricultural experiment stations to "aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

2. The Adams Act (March 16, 1906) authorizes \$15,000 per annum to each State for the more complete endowment and maintenance of the State agricultural experiment stations to be "applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States."

④ 在 2000 年 12 月 31 日, 乙公司应计提的坏账准备为 100 元。

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3. The Purnell Act (February 24, 1925) authorizes \$60,000 per annum to each State for the more complete endowment of agricultural experiment stations to be "applied only to paying the necessary expenses of conducting investigations or making experiments bearing directly on the production, manufacture, preparation, use, distribution, and marketing of agricultural products and including such scientific researches as have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life and for printing and disseminating the results of said researches."

4. The Hawaii Station Act (May 16, 1928) extends the benefits of the Hatch, Adams, and Purnell Acts to the Territory of Hawaii and authorizes appropriations for this purpose as follows: Fiscal year 1930, \$15,000; 1931, \$20,000; 1932 to 1936, inclusive, \$2,000 increase each year over the preceding year; 1937, \$50,000; 1938 to 1941, inclusive, \$10,000 increase each year over the preceding year; and thereafter \$90,000 per year.

5. The Alaska Station Act (February 23, 1929) extends the benefits of the Hatch Act to the Territory of Alaska and authorizes an appropriation of \$15,000 per annum for this purpose.

6. The Alaska Station Act (June 20, 1936) extends the benefits of the Adams and Purnell Acts to the Territory of Alaska and authorizes appropriations as follows: Fiscal year 1937, \$5,000; 1938, \$7,500; 1939 to 1944, inclusive, \$2,500 increase each year over the preceding year; 1945 to 1947, inclusive, \$5,000 increase each year over the preceding year; and thereafter a sum equal to one-half that provided for each State and Territory under the Adams Act and the Purnell Act.

7. The Puerto Rico Station Act (March 4, 1931) extends the benefits of the Hatch, Adams, and Purnell Acts to Puerto Rico and authorizes appropriations as follows: Fiscal year 1933, \$15,000; 1934 to 1940, inclusive, \$5,000 increase each year over the preceding year; 1941 to 1944, inclusive, \$10,000 increase each year over the preceding year; and thereafter \$90,000 per year.

8. The Bankhead-Jones Act, Title I (June 29, 1935).--The principal points of this Title of the Act are as follows:

Section 1 authorizes and directs the Secretary of Agriculture "to conduct research into laws and principles underlying basic problems of agriculture in its broadest aspects; research relating to the improvement of the quality of, and the development of new and improved methods of production of, distribution of, and new and extended uses and markets for, agricultural commodities and by-products and manufactures thereof; and research relating to the conservation, development, and use of land and water resources for agricultural purposes." The research authorized under this section is conducted by such agencies of the Department of Agriculture as the Secretary may designate or establish.

Under Section 2 the Secretary is authorized and directed to encourage research similar to that authorized under section 1 to be conducted by the agricultural experiment stations of the land-grant colleges.





To accomplish these two purposes, Section 3 authorizes an appropriation of "\$1,000,000 for the fiscal year beginning after the date of the enactment of this title, and for each of the four fiscal years thereafter \$1,000,000 more than the amount authorized for the preceding fiscal year, and \$5,000,000 for each fiscal year thereafter."

Section 4 provides that "Forty per centum of the sums appropriated for any fiscal year under section 3 shall be available for the purposes of section 1" and that not more than "2 per centum of the sums appropriated may be used for the administration of section 5." The sums available for the purposes of section 1 are designated as the "Special research fund, Department of Agriculture", one-half of which is for "the establishment and maintenance of research laboratories and facilities in the major agricultural regions" and for the prosecution of research at such laboratories.

Section 5 provides that sixty per centum of the sums appropriated in any fiscal year shall be available for the purposes of section 2 and that the Secretary shall make the allotments to Puerto Rico and each State and Territory on the basis of rural population. This section provides further: "No allotment and no payment under any allotment shall be made for any fiscal year in excess of the amount which Puerto Rico or the State or Territory makes available for such fiscal year out of its own funds for research and for the establishment and maintenance of necessary facilities for the prosecution of such research."

The allotments under the Act to the several States, Alaska, Hawaii, and Puerto Rico as appropriated for the fiscal years 1938 and 1939 and as estimated for the fiscal year 1940 are shown in the following table:



## PAYMENTS TO STATES, HAWAII, ALASKA, AND PUERTO RICO UNDER BANKHEAD-JONES ACT, TITLE 1

| Station                | Appropriated,<br>1938 | Appropriated,<br>1939 | Estimated,<br>1940 |
|------------------------|-----------------------|-----------------------|--------------------|
| Alabama.....           | \$62,021.34           | \$72,358.23           | \$82,695.12        |
| Alaska.....            | 1,677.36              | 1,956.92              | 2,236.48           |
| Arizona.....           | 9,316.92              | 10,869.74             | 12,422.56          |
| Arkansas.....          | 47,987.40             | 55,985.30             | 63,983.20          |
| California.....        | 49,456.47             | 57,699.21             | 65,941.96          |
| Colorado.....          | 16,823.22             | 19,627.09             | 22,430.96          |
| Conn. (New Haven)..... | 7,746.78              | 9,037.91              | 10,329.04          |
| Conn. (Storrs).....    | 7,746.78              | 9,037.91              | 10,329.04          |
| Delaware.....          | 3,757.65              | 4,383.93              | 5,010.20           |
| Florida.....           | 23,101.23             | 26,951.43             | 30,801.64          |
| Georgia.....           | 65,642.19             | 76,582.56             | 87,522.92          |
| Hawaii.....            | 6,889.80              | 8,038.10              | 9,186.40           |
| Idaho.....             | 10,288.92             | 12,003.74             | 13,718.56          |
| Illinois.....          | 65,052.39             | 75,894.45             | 86,736.52          |
| Indiana.....           | 47,041.95             | 54,882.28             | 62,722.60          |
| Iowa.....              | 48,640.98             | 56,747.81             | 64,854.64          |
| Kansas.....            | 37,538.22             | 43,794.59             | 50,050.96          |
| Kentucky.....          | 59,203.53             | 69,070.78             | 78,938.04          |
| Louisiana.....         | 41,350.08             | 48,241.76             | 55,133.44          |
| Maine.....             | 15,519.12             | 18,105.64             | 20,692.16          |
| Maryland.....          | 21,412.86             | 24,981.67             | 28,550.48          |
| Massachusetts.....     | 13,636.65             | 15,909.43             | 18,182.20          |
| Michigan.....          | 50,225.88             | 58,596.86             | 66,967.84          |
| Minnesota.....         | 42,598.23             | 49,697.93             | 56,797.64          |
| Mississippi.....       | 54,488.55             | 63,569.98             | 72,651.40          |
| Missouri.....          | 57,725.85             | 67,346.82             | 76,967.80          |
| Montana.....           | 11,627.37             | 13,565.27             | 15,503.16          |
| Nebraska.....          | 29,082.45             | 33,929.52             | 38,776.60          |
| Nevada.....            | 1,845.48              | 2,153.06              | 2,460.64           |
| New Hampshire.....     | 6,267.90              | 7,312.55              | 8,357.20           |
| New Jersey.....        | 22,894.38             | 26,710.11             | 30,525.84          |
| New Mexico.....        | 10,320.75             | 12,040.88             | 13,761.00          |
| New York (Geneva)..... | 6,737.37              | 7,860.26              | 8,983.16           |
| New York (Ithaca)..... | 60,636.36             | 70,742.42             | 80,848.48          |
| North Carolina.....    | 76,971.00             | 89,799.50             | 102,628.00         |
| North Dakota.....      | 18,506.82             | 21,591.29             | 24,675.76          |
| Ohio.....              | 69,761.07             | 81,387.92             | 93,014.76          |
| Oklahoma.....          | 51,338.13             | 59,894.48             | 68,450.84          |
| Oregon.....            | 15,131.85             | 17,653.83             | 20,175.80          |
| Pennsylvania.....      | 101,017.14            | 117,853.33            | 134,689.52         |
| Puerto Rico.....       | 36,414.12             | 42,483.14             | 48,552.16          |
| Rhode Island.....      | 1,697.88              | 1,980.86              | 2,263.84           |
| South Carolina.....    | 44,598.72             | 52,031.84             | 59,464.96          |
| South Dakota.....      | 18,324.33             | 21,378.38             | 24,432.44          |
| Tennessee.....         | 56,087.91             | 65,435.90             | 74,783.88          |
| Texas.....             | 112,023.57            | 130,694.16            | 149,364.76         |
| Utah.....              | 7,877.76              | 9,190.72              | 10,503.68          |
| Vermont.....           | 7,853.70              | 9,162.65              | 10,471.60          |
| Virginia.....          | 53,358.42             | 62,251.49             | 71,144.56          |
| Washington.....        | 22,136.79             | 25,826.26             | 29,515.72          |
| West Virginia.....     | 40,360.08             | 47,086.76             | 53,813.44          |
| Wisconsin.....         | 45,168.66             | 52,696.77             | 60,224.88          |
| Wyoming.....           | 5,069.64              | 5,914.58              | 6,759.52           |
| Total.....             | 1,800,000.00          | 2,100,000.00          | 2,400,000.00       |



(b) IN ALL, PAYMENTS TO STATES, HAWAII, ALASKA AND PUERTO  
RICO FOR AGRICULTURAL EXPERIMENT STATIONS

Change in Language

After the phrase "In all, payments to States, Hawaii, Alaska and Puerto Rico for Agricultural Experiment Stations", the Budget estimate proposes inserting the words "to be accounted for as one fund". Similar language is also recommended to be inserted at the end of other bureau appropriations where there are a number of subappropriation items. (See list at end of this note.) The purpose of this amendment is to clarify the authority for continuation of the existing practice, which has been followed for many years, of maintaining the "cash accounts" only by main heads of appropriations on the records of the Department of Agriculture and the Treasury Department. While the cash accounts are maintained by main heads, rather than by subheads, an effective accounting and audit control of all subappropriations is maintained by both the Department and the General Accounting Office.

The controlling general ledger accounts of the Department of Agriculture are kept, in accordance with the standard uniform accounting system installed by the General Accounting Office, by double-entry in two series of ledger accounts, the debit entry series consisting of the cash controls which are maintained only by main heads of appropriations and the credit entry series consisting of the budgetary controls which are maintained by subappropriations and other legislative and administrative limitations imposed on the use and expenditure of appropriated moneys. The basic reason for this distinction has been that the records of the Division of Bookkeeping and Warrants, and of the Division of Disbursement, Treasury Department, have been kept only by main heads of appropriations, which permitted, and in fact necessitated, the maintenance of this Department's "cash" control accounts on the same basis. Recently, however, the Treasury Department announced its intention of establishing on the books of its Division of Bookkeeping and Warrants, beginning with the fiscal year 1940, a separate appropriation account for each item of subappropriation, the question having been raised lately whether the present phraseology "In all, salaries and expenses", at the end of each main head of appropriation, provides sufficient legislative authority for the continuation of the existing practice. Since the splitting of the cash accounts in this manner would necessitate the appropriation of additional funds for the accounting work which would be involved in the Department of Agriculture, and since the added procedural requirement would retard the prompt transaction of business by the Department of Agriculture, without compensating advantages, the addition of the words "to be accounted for as one fund" is proposed in order to entirely clarify the intent.

From the standpoint of legal flexibility in the use of Department of Agriculture funds, the exercise of strict control thereover by the Department to assure administrative compliance with all legislative limitations, and the detailed check thereon by the General Accounting Office, the changes proposed by the Treasury Department would neither add to nor subtract from the present situation, for the reason that all appropriation,







allotment, and budgetary accounting and administrative auditing in this Department, as well as the final accounting and auditing in the General Accounting Office, are on a subappropriation basis.

The proposed change in Treasury procedure would, however, augment the number of this Department's general ledger accounts in the cash control series, previously mentioned, from 81 to approximately 200 (or about 600 on the three-year basis of appropriation availability) and substantially increase the work to be performed by the Department's Division of Accounts in maintaining the additional accounts and in requisitioning for the Chief Disbursing Officer, Treasury Department, and transferring to his numerous Regional Disbursing Officers, the necessary disbursing funds under each subappropriation. This would, in turn, correspondingly multiply the number of separate cash accounts, under which the Chief Disbursing Officer and each of his 28 regional, insular, and foreign assistant disbursing officers serving this Department would be required to operate and would create a burden due to constantly reviewing such individual accounts to determine that sufficient cash is available at all times to make possible the prompt payment of numerous vouchers thereunder. While the "Accounts Current" of the disbursing officers as now submitted to the Comptroller General list only the main heads of appropriations, they are accompanied by a summary of disbursements and collections by subappropriations and limitations, administratively prepared for information of and certification by the General Accounting Office, hence accomplishing in a simpler manner all that would be accomplished if the cash accounts were maintained separately.

It was originally estimated by the Department that an additional appropriation of at least \$14,000 would be required if the cash accounts were required to be handled separately for each subappropriation - this amount to cover the appointment of seven additional employees (1 in Grade CAF-8 at \$2,900; 2 in Grade CAF-4 at \$1,800 each; and 4 in Grade CAF-3 at \$1,620 each). In the interest of economy, however, the Bureau of the Budget considered it preferable, for the time being at least, to continue the present long-established practice, but believed it advisable to clarify, for the benefit of the Treasury Department, the legislative basis for such continuation. Precedent for the proposed clarification will be found in the provisions of similar intent under the appropriations for "National Park Service, Department of the Interior".



The bureaus and offices of this Department under which this change is proposed are as follows:

- Office of Experiment Stations
- Extension Service
- Weather Bureau
- Bureau of Animal Industry
- Bureau of Dairy Industry
- Bureau of Plant Industry
- Forest Service
- Bureau of Agricultural Chemistry and Engineering
- Bureau of Entomology and Plant Quarantine
- Bureau of Biological Survey
- Bureau of Agricultural Economics
- Agricultural Marketing Service
- Bureau of Home Economics
- Food and Drug Administration
- Soil Conservation Service

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(c) ADMINISTRATION OF GRANTS TO STATES  
AND COORDINATION OF RESEARCH

|                               |                |
|-------------------------------|----------------|
| Appropriation Act, 1939 ..... | \$161,735      |
| Budget Estimate, 1940 .....   | <u>161,735</u> |

## PROJECT STATEMENT

| Project  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-----------|---------------------|---------------------|
| Administration and coordination of Federal aid to agricultural experiment stations; assistance in coordination of research work of the Department; assistance in coordination of research work of the Department with that of the State stations; administration of Department insular stations; and preparation of "Experiment Station Record" and other publications.... | \$159,961 | \$161,735           | \$161,735           |
| Reserve and unobligated balance.....   | 1,774     | - - -               | - - -               |
| Total appropriation.....   | 161,735   | 161,735             | 161,735             |

## WORK UNDER THIS APPROPRIATION

The Office of Experiment Stations (a) represents the Department in the administration of the Acts of Congress making appropriations for the support of State and Territorial agricultural experiment stations in the several States, Hawaii, Alaska, and Puerto Rico (Hatch Act, Adams Act, Purnell Act, and the Hawaii, Alaska, and Puerto Rico Stations Acts); (b) assists in the coordination of the research work of the Department, the coordination of the research of the State agricultural experiment stations, and the coordination of the research work of the Department with that of the State agricultural colleges and experiment stations; and (c) administers the Federal agricultural experiment station in Puerto Rico, and administered the Federal agricultural experiment station in Hawaii to the close of the fiscal year 1938.

Administration of the Acts granting funds to States and Territories involves supervision of the funds, close advisory relations with the stations as to research for which the funds are expended, annual examination of the work and expenditures of each station, coordination of the research activities of the Department with those of State stations, preparation and issuance of "Experiment Station Record" and other reports, and preparation of the annual report to Congress on the work and expenditures of the stations as required by law.

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1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 25

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The Federal funds paid to the States and Territories are largely expended on research projects submitted to the Office of Experiment Stations for advisory suggestions and approval in advance of expenditures. Programs of projects with proposed expenditures under the Federal funds are submitted by each station for review and approval at the beginning of each fiscal year. Changes and adjustments in work to best meet State needs are submitted throughout the year. There were 2,165 active Adams and Purnell projects in 1938, of which 355 were new or revised during the year.

To carry out the provisions of the Federal Acts a representative or representatives, of the Office visits each of the 50 State stations at least once annually and spends four to twenty-one days reviewing the expenditures and the research under way. In addition, staff members cooperate as specialists with individual stations and regional groups in the consideration of research programs for special fields.

Coordinating the research of the Department of Agriculture with that of the State and Territorial stations and coordinating the research work among State stations is constantly in mind when the proposed research projects under Federal funds are reviewed for approval and when the work and expenditures of each station are reviewed and discussed with the State station directors and research staffs. Through personal conferences and committees having to do with research, close advisory relations are maintained with bureaus of the Department. Every opportunity is taken to promote effective cooperation between and among the State stations and between the State stations and the Department. During the fiscal year 1938 there were over 1,350 new or revised formal agreements covering cooperative research between State stations and the bureaus of the Department. These had been carefully planned by the cooperating agencies and written agreements signed. These agreements were reviewed and filed by the Office of Experiment Stations. The number of agreements entered into by individual stations ranged from 6 to 58.

"Experiment Station Record" was established in 1889 as a part of the Federal-State joint participation in establishing and maintaining agricultural experiment stations. Its purpose is to make available promptly to staff members of all stations and the Department abstracts of current published results of research in this and other countries as an aid in planning research, avoiding duplication, and coordinating research effort. A total of about 7,000 such abstracts are prepared, edited, and published annually, involving translations from twelve or more languages. The abstract volumes are supplemented by indexes and a combined index is published for each ten volumes. Few, if any, of the stations have all the publications available, and the abstracting done by the Office of Experiment Stations avoids the necessity of duplicate abstracting by the several thousand research workers.

As a central agency for the State stations the Office of Experiment Stations compiles lists of research projects in special fields, maintains an up-to-date list of the organization and personnel of the several stations, and publishes a revised list annually, issues a monthly mimeographed list of new station publications, and prepares other lists and compilations of information.

The Office also answers a very large volume of inquiries from all parts of the world regarding the organization, personnel, relationships, and work of the State stations and agricultural conditions and possibilities in Hawaii, Alaska, Guam, the Virgin Islands, and Puerto Rico.

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Assistance in coordinating the research work of the Department of Agriculture is accomplished through advising with the bureau chiefs and the Secretary of Agriculture with regard to the coordination and correlation of proposed research. Special attention is given to adjustments of closely related research in different bureaus and to the coordination and integration of any new research with existing activities of the Department. The Office of Experiment Stations is responsible for the development of the programs, for presentation to the Secretary, for work to be undertaken by the bureaus of the Department under special research projects and at the special research laboratories in the major agricultural regions provided for by Title I of the Bankhead-Jones Act, for general assistance in the planning, directing, and supervising of the work, and for the administration of the funds. In connection with other funds of the Department, the Chief of the Office participates in the preparation of research programs and budget estimates, especially in regard to coordination and cooperation, and serves on some 12 committees having to do primarily with policy, coordination, and cooperation in research.

The Office now has additional responsibility and additional work in connection with the task of coordinating the work of the Department and the work of the State stations with the program of the four new regional research laboratories authorized by the Agricultural Adjustment Act of 1938. Acting as a central clearing house of information as to the program at each State experiment station and as to records of cooperation between the bureaus of the Department and the State stations, the office staff naturally and necessarily will be called upon continuously for information and assistance.

As is explained under the heading "Special Research Fund, Department of Agriculture," the Office has the responsibility for the administration of the payments to States, authorized by Title I of the Bankhead-Jones Act of June 29, 1935, and for the administration, including the planning, programming, and coordination of the special research projects, and the special research regional laboratory projects conducted under the Special Research Fund, as authorized by Title I of the Bankhead-Jones Act of June 29, 1935.

Administration of the Federal stations in Puerto Rico and Hawaii involves approval of budgets, expenditures, and research projects; the review, editing, and approval of publications; and general administrative direction. During the past few years there has developed, in addition, a responsibility for coordination of the work of these Federal stations with the work of the Territorial experiment stations. Hawaii, under the Hawaii Station Act of May 16, 1928, and Puerto Rico, under the Puerto Rico Station Act of March 4, 1931, now receive the benefit of the funds under the Hatch and supplemental Acts. The Acts granting these funds to the Territories, however, provide that the Secretary of Agriculture shall coordinate the work of the Territorial stations and the work of the Federal stations.

In addition to the regular appropriations for the Federal Hawaii and Puerto Rico stations, the President approved on April 24, 1935, one Sugar Processing Tax Order allotting \$113,000 to the Puerto Rico station, and between August 21 and October 24, 1935, seven such orders allotting a total of \$410,000 to the Hawaii station. These allotments were continued by the Supplemental Appropriation Act, fiscal year 1936 (49 Stat., 1116). The funds, which weremade available until expended, are now practically exhausted.





## (d) INSULAR EXPERIMENT STATIONS

|                              |               |
|------------------------------|---------------|
| Appropriation Act, 1939..... | \$67,245      |
| Budget Estimate, 1940.....   | 83,000        |
| Increase.....                | <u>15,755</u> |

## PROJECT STATEMENT

| Projects   | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase      |
|--|---------|---------------------|---------------------|---------------|
| 1. Federal Experiment Station<br>in Hawaii.....      | \$2,065 | - - -               | - - -               | - - -         |
| 2. Federal Experiment Station<br>in Puerto Rico..... | 67,208  | \$67,245            | \$83,000            | + \$15,755(1) |
| Unobligated balance.....                             | 38      | - - -               | - - -               | - - -         |
| Total appropriation.....                             | 69,311  | 67,245              | 83,000              | + 15,755      |

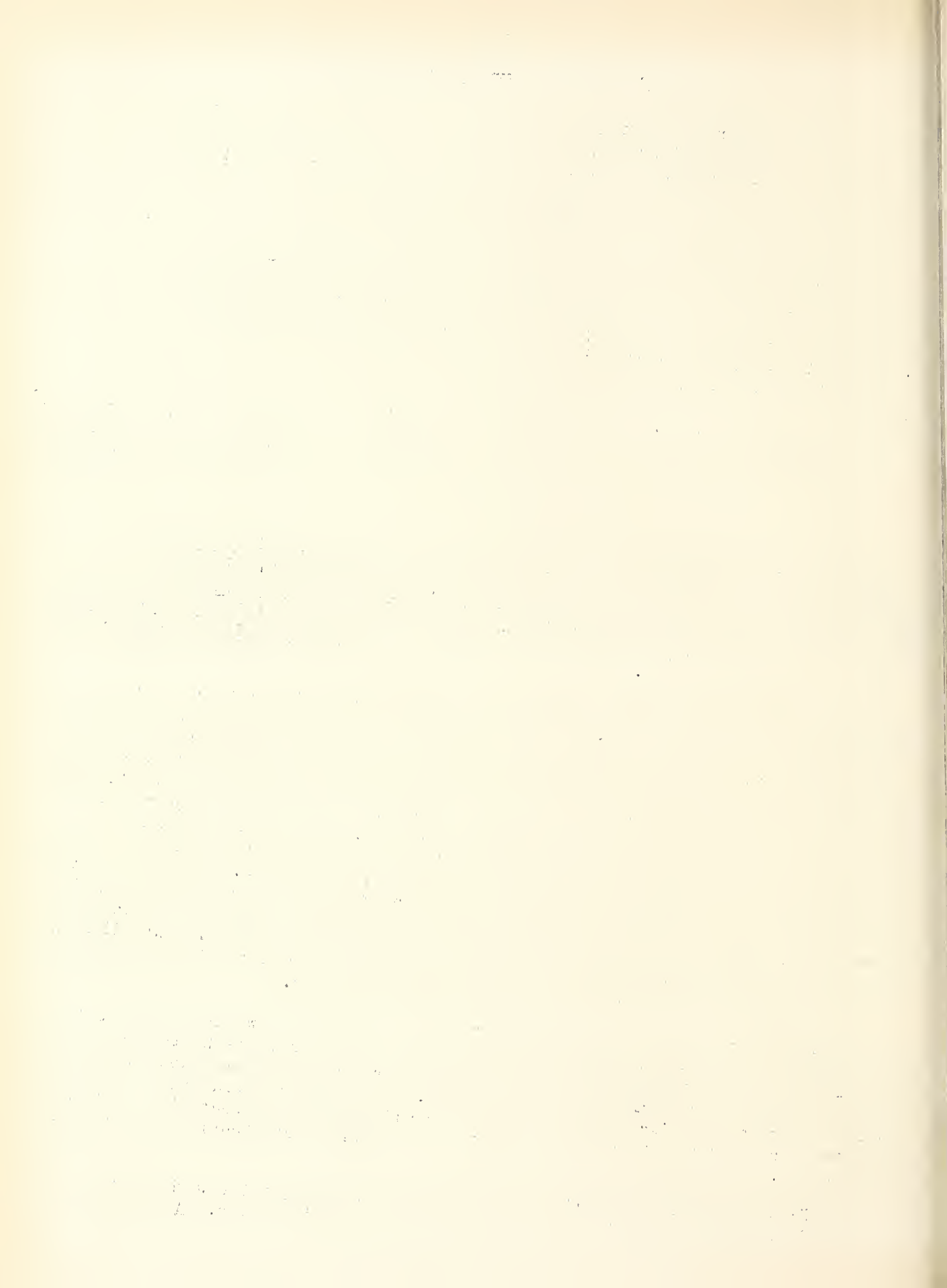
## INCREASE

(1) The increase of \$15,755 in this item is for extended investigations by the Federal Experiment Station in Puerto Rico on insecticidal plants to develop increased concentrations of rotenone and to lower the cost of production, and on quinine to determine the best species to plant, optimum conditions of growth, the most economic means of producing quinine trees and to obtain high yields from the bark.

In the fiscal year 1936, under funds made available by Puerto Rico Sugar Processing Tax Fund Order No. 5, the Puerto Rico station began investigations on tropical insecticidal plants which are sources of rotenone, the insecticidal material which is highly toxic to many insects but harmless to human beings and domestic animals. This material has made possible, for many uses, insecticides which do not leave objectionable or harmful residues on the edible portions of agricultural products treated with the insecticide. These insecticides have been effective in controlling a number of different insects, and the indications are that their use will be extended to control other insect pests. An additional advantage in the use of these insecticides is that they do not cause toxicity in the soil as is the case when inorganic poison insecticides are used in large quantities. The value of rotenone as an insecticide is now firmly established, and its use is increasing, but world supplies are not adequate, it is expensive, and at present it occurs in nature at low concentrations.

As a result of the work at the Puerto Rico Station, we have perhaps the best collection of rotenone-producing plants. The investigations indicate possibilities of materially increasing the concentrations of toxic substances and of development toward commercial production. The work proposed under the requested increase is for this purpose, especially with the expectation of lowering the cost of production and of developing a useful practicable agricultural enterprise.

Preliminary investigations were also started on quinine with funds made available by Puerto Rico Sugar Processing Tax Fund Order No. 5. At the present





time practically all the quinine used by the United States, both for the civilian population and the military forces, is obtained from the Dutch East Indies. There is no other drug which can be used as effectively in treating certain serious maladies. It is important that this country develop its own source of supply of quinine, in case the present market sources are closed. As a result of the preliminary work of the Puerto Rico Station, species of quinine-producing plants have been introduced and the research has demonstrated that quinine trees can be grown in Puerto Rico, as evidenced by the successful growth of the limited plantings of the Puerto Rico Station. If the original intent of the project (to develop a source of supply of quinine for use in case the present source should be cut off) is to be carried out, there is need for further, more extended studies to determine the best species to plant, the optimum conditions of growth, and the most economic means of production of quinine trees and to obtain high yields of quinine from the bark.

#### WORK UNDER THIS APPROPRIATION

General.--This appropriation provides (a) through the fiscal year 1938, for the maintenance of a Federal experiment station in Hawaii to conduct investigations for the improvement and diversification of Hawaiian agriculture; and (b) for the maintenance of a Federal agricultural experiment station in Puerto Rico to serve as a tropical outpost station of the Department and to conduct investigations, to a limited extent, for the benefit of Puerto Rican agriculture. The Hawaii Station Act (Act of May 16, 1928) and the Puerto Rico Station Act (Act of March 4, 1931) provide for the coordination of the Federal stations and their work with the stations of the Hawaii and Puerto Rico agricultural colleges.

1. Federal Experiment Station in Hawaii.--This project was discontinued at the close of the fiscal year 1938 and the independent Federal station was consolidated with the Territorial Station as a result of the policy followed in recent years of reducing the appropriation for the Federal Experiment Station in Hawaii as Federal grant fund authorizations to Hawaii increased under the Hawaii Station Act of 1928.

The Federal station at Honolulu, which was maintained in cooperation with the University of Hawaii, was concerned with problems relating to the diversification of agriculture and the establishment of industries other than sugar and pineapple production. These major industries have their own experiment stations, but close cooperation was maintained with them on problems of mutual interest. The principal activities of the station were studies designed to aid the so-called small farmer as contrasted with the plantation system. Work along this line will be continued by the Territorial Station.

Between August 21 and October 24, 1935, the President approved seven Sugar Processing Tax Orders allotting a total of \$410,000 to the Hawaii Agricultural Experiment Station of the Department. The allotments were continued by the Supplemental Appropriation Act, fiscal year 1936 (49 Stat., 1116), and are available until expended. These allotments were for taro investigations, liver fluke eradication, a rat-abatement program, development of truck farming and improvement of marketing facilities, development of livestock feed, development of tropical fruits and nuts, and promotion of the poultry industry. The work under the several allotments was carried out on plans agreed upon by the Hawaiian Agricultural Advisory Committee, the Directors of the Federal and



Territorial Agricultural Experiment Stations, and the Chief of the Office of Experiment Stations. These funds are now practically exhausted.

2. Federal Experiment Station in Puerto Rico.--The agricultural experiment station maintained by the Department at Mayaguez, Puerto Rico, since 1902, was established to aid in the improvement and diversification of agriculture in the island.

Since 1935 the Agricultural Experiment Station of the University of Puerto Rico has been receiving gradually increasing Federal grants for agricultural research under the Puerto Rico Station Act of 1931. In accordance with the provisions of this Act, the work of the Federal and the University of Puerto Rico stations is coordinated. The Federal grants to the University of Puerto Rico station are enabling it to gradually assume increasing responsibility for needed research on the problems of concern to Puerto Rico alone, and the Department station is thereby able to serve more as a Federal tropical station where all bureaus of the Department may be provided with facilities for study of problems requiring or profiting by research under tropical conditions.

During the fiscal year 1938 the Bureau of Plant Industry, Bureau of Entomology and Plant Quarantine, Forest Service, and Soil Conservation Service of the Department of Agriculture and the Puerto Rico Reconstruction Administration of the Department of the Interior have maintained activities at Mayaguez, using the facilities of the experiment station.

In addition to the lines of work discussed in connection with the recommended increase, the investigations of the Puerto Rico station include:

(a) Breeding work with vegetables for the production of improved varieties for the continental United States. With the twelve months' growing season in Puerto Rico, such work can be pursued more rapidly there. For example, breeding work is being conducted with sweetpotatoes which do not flower in the continental United States and, therefore, afford no opportunity for cross-pollination here. Cucumbers are being bred to develop a good market type resistant to downy mildew. Work is also being conducted on sweet corn and calabazas, which are native vegetables similar to our squashes and pumpkins.

(b) Plant introductions and studies to develop the most effective methods of propagating tropical and subtropical plants. An extensive collection of tropical and subtropical plants is maintained. These introductions and collections hold possibilities of crop improvement for sections of subtropical agriculture in the United States.

(c) Investigations to study the possibility of developing domestic sources of drugs now imported, such as cocaine, theobromine, strychnine, cajuput oil, and senna.

(d) Entomological work, conducted under the technical supervision of the Bureau of Entomology and Plant Quarantine, involving the introduction of beneficial insects into Puerto Rico for their colonization there and further introduction into the continental United States, and studies of insect pests of tropical plants. The insects upon which work is being carried on include the Amazon fly and Chelonus annulipes, which parasitize the sugarcane moth borer; Anagyrus coccidivorus, which is a parasite of the pineapple mealybug; and species of predatory beetles which parasitize pod borers and the yellow cane aphid.



Under Puerto Rico Tax Fund Order No. 5, approved April 24, 1935, by the President, \$113,000 was transferred to the Federal Experiment Station in Puerto Rico for experimentation in the propagation and breeding of tropical plants and studies of domestic animal parasites. This allotment was continued under the Supplemental Appropriation Act, fiscal year 1936, and is available until expended. Six lines of work were set up under these funds, as follows: Drug and insecticidal plants; bamboo utilization and propagation; tropical economic plant introductions and investigations; tropical field crops; tropical horticultural crops; and animal parasitology. These funds are now practically exhausted.

The work conducted in Puerto Rico for the benefit of the agriculture of the continental United States is also helpful to Puerto Rico, partly in solving its local agricultural production problems, and partly, perhaps, in developing new intensive industries, such as drug and insecticidal plants, to supply needs in the United States.

With the discontinuance of the Federal Experiment Station in Hawaii at the close of the fiscal year 1938, all the Federal stations formerly maintained in Alaska, Guam, Hawaii, and the Virgin Islands have been closed and the only Department station remaining will be the Puerto Rico station. The maintenance of one Department outpost station in the Tropics in behalf of agriculture of the continental United States facilitates the research work of a number of bureaus of the Department.

(e) IN ALL, SALARIES AND EXPENSES

Change in Language

It is recommended that the language of this paragraph be amended by inserting after the words "In all, salaries and expenses," the following:

"to be accounted for as one fund"

This language is needed to clarify the authority to continue maintenance of disbursing accounts under one heading as explained in detail under "In all, Payments to States, Hawaii, Alaska and Puerto Rico for Agricultural Experiment Stations, Office of Experiment Stations" on page #54 of these notes.







## SUPPLEMENTAL FUNDS

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Administration of Agricultural Adjustment Act of 1938: Development of plans for the establishment of the regional research laboratories authorized by Section 202 of the Agricultural Adjustment Act of 1938</u> | - -                         | - -                         | 115             |
| <u>Payments for Agricultural Adjustment:</u>  |                             |                             |                 |
| Federal Experiment Station in Hawaii:   |                             |                             |                 |
| Taro investigations.....  | - -                         | 10                          | 5,722           |
| Liver fluke eradication.....  | - -                         | 874                         | 11,199          |
| Rate abatement campaign.....  | - -                         | - -                         | 4,336           |
| Development of truck farming and improvement of marketing facilities...   | - -                         | 14                          | 11,236          |
| Development of livestock feed.....  | - -                         | 345                         | 25,307          |
| Development of tropical fruits and nuts.  | - -                         | 12                          | 9,631           |
| Promotion of the poultry industry.....  | - -                         | 239                         | 12,475          |
| Federal Experiment Station in Puerto Rico:  |                             |                             |                 |
| Experimentation in the propagation and breeding of tropical plants and studies of domestic animal parasites.....  | - -                         | 2,587                       | 4,288           |
| Total, Payments for Agricultural Adjustment.....  | - -                         | 4,081                       | 84,194          |
| Total, Agricultural Adjustment Administration.....  | - -                         | 4,081                       | 84,309          |
| <u>Special Research Fund:</u>   |                             |                             |                 |
| Administration of payments to States under Title I, Bankhead-Jones Act of June 29, 1935.....  | 28,000                      | 28,000                      | 23,863          |
| Administration, including the planning, programming, and coordination, of special research projects authorized by Title I, Bankhead-Jones Act of June 29, 1935.....   | 12,000                      | 12,000                      | 5,854           |
| Administration, including the planning, programming, and coordination of special research regional laboratories authorized by Title I, Bankhead-Jones Act of June 29, 1935.....                                     | 10,000                      | 8,000                       | 1,686           |
| Total, Special Research Fund.....   | 50,000                      | 48,000                      | 31,403          |

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## SUPPLEMENTAL FUNDS - Continued

| Projects  | Estimated obligations<br>1940 | Estimated obligations<br>1939 | Obligated<br>1938 |
|---|-------------------------------|-------------------------------|-------------------|
| <u>Conservation and Use of Agricultural Land Resources (New Uses and Markets for Farm Commodities, Regional Laboratories and Surveys):</u> Planning and coordination of the program of the regional research laboratories authorized by Section 202 of the Agricultural Adjustment Act of 1938..... | 20,000                        | 28,634                        | - -               |
| Total, Supplemental Funds.....  | 70,000                        | 80,715                        | 115,712           |

## PASSENGER-CARRYING VEHICLES

The amount of the authorization for the purchase of passenger-carrying vehicles for the Office of Experiment Stations during 1940 remains unchanged at \$750. This \$750 will permit the needed purchase of one new vehicle, which is a replacement, for use at the Puerto Rico Station. In the fiscal year 1940 a passenger-carrying automobile which was purchased in 1934 will be retired from service, dismantled, and the parts used as spare parts. This disposition of the old car will be more economical than trading it in on the new car for an estimated allowance of \$75.

It is not planned that the authority for replacement of a car in the fiscal year 1939 will be used. At the time the estimates were prepared for 1939, the repair bills on the car to be replaced were so great that it was felt that replacement would be more economical by this fiscal year. During the past year, however, few repairs have been necessary and the operating costs have not been as high as anticipated so that it is believed that this automobile may be operated with advantage until the fiscal year 1940. Postponement until 1940 of the replacement of the passenger-carrying automobile will permit, instead, the much-needed replacement of a small truck during the fiscal year 1939.

The automobile is needed to afford facilities for the research staff of the Federal Experiment Station in Puerto Rico in conducting the work jointly and in coordination with that of the experiment stations of the College of Agriculture of the University of Puerto Rico as required by law. The investigations are located at the Federal station at Mayaguez, the insular stations at Rio Piedras and Isabela, the insular demonstration farms, and other places in the island. The prosecution of the joint research necessitates frequent trips of the Director and other members of the technical staff from Mayaguez to the other stations and to points throughout the island. The poor transportation facilities in Puerto Rico make it essential that automobiles be available so that the research work throughout the island will not be impeded.



SPECIAL RESEARCH FUND, DEPARTMENT OF AGRICULTURE

Appropriation Act, 1939..... \$1,400,000  
 Budget Estimate, 1940..... 1,400,000

## PROJECT STATEMENT

| Projects   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-----------|---------------------|---------------------|
| 1. Administration of payments to States under Title I, Bankhead-Jones Act..... | \$23,863  | \$28,000            | \$28,000            |
| 2. Special research projects, Department of Agriculture.....                   | 521,835   | 672,000             | 672,000             |
| 3. Special research laboratories in major agricultural regions.....            | 594,343   | 700,000             | 700,000             |
| Unobligated balance.....   | 59,959    | ----                | ----                |
| Total appropriation.....   | 1,200,000 | 1,400,000           | 1,400,000           |

## CHANGE IN LANGUAGE

It is recommended that the language of this paragraph be amended by the insertion of authority to use these funds for "printing the results" of the research work conducted thereunder. This proposed change is consistent with the provisions of Title I of the **Bankhead-Jones Act** of June 29, 1935, which authorized the establishment of this fund. Section 3 of that title of the Act provides that:

Moneys appropriated in pursuance of this title shall also be available for the purchase and rental of land and the construction of buildings necessary for conducting research provided for in this title, for the equipment and maintenance of such buildings, and for printing and disseminating the results of research.

In view of this authorization, no estimate has been included under the general printing and binding fund of the Department for printing the results of research conducted under the Special Research Fund. The work under this fund, which was first made available in the fiscal year 1936, is progressing so that provision is needed for printing the results of the research.

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF THE HISTORY OF ARTS  
AND ARCHITECTURE

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AND ARCHITECTURE



## WORK UNDER THIS APPROPRIATION

General.--The "Special research fund, Department of Agriculture", authorized by sections 3 and 4, Title I, of the Bankhead-Jones Act (approved June 29, 1935), provides for (1) administration of the provisions of the Act authorizing payments to States, Hawaii, Alaska, and Puerto Rico for research to be conducted by agricultural experiment stations; (2) special research projects approved by the Secretary of Agriculture and conducted by such agencies of the Department of Agriculture as the Secretary may designate or establish; and (3) the establishment and maintenance of research laboratories and facilities in major agricultural regions of the United States and the prosecution of research at such laboratories. Section 1 of the Act (see Office of Experiment Stations for digest of Title I) specifies that the work conducted under the Special Research Fund shall be "research into laws and principles underlying basic problems of agriculture in its broadest aspects; research relating to the improvement of the quality of, and the development of new and improved methods of production of, distribution of, and new and extended uses and markets for, agricultural commodities and by-products and manufactures thereof; and research relating to the conservation, development, and use of land and water resources for agricultural purposes."

Sections 3 and 4 of Title I of the Bankhead-Jones Act of June 29, 1935, authorize appropriations for the Special Research Fund of \$400,000 for the fiscal year 1936, \$800,000 for the fiscal year 1937, \$1,200,000 for the fiscal year 1938, \$1,600,000 for the fiscal year 1939, and \$2,000,000 for the fiscal year 1940 and each year thereafter. The full amounts authorized were appropriated for the fiscal years 1936, 1937, and 1938. The appropriation for 1939 and the estimate for 1940 is \$1,400,000.

1. Administration of Payments to States under Title I, Bankhead-Jones Act.--The administration of the provisions of the Act, which authorize allotments to the States, Territories, and Puerto Rico, is conducted along the same general lines as that of the previous Acts granting funds to the State experiment stations for research work (Hatch, Adams, and Purnell Acts). Such administration includes examination and approval of research projects in advance of the expenditure of funds, review of the work and expenditures at each station as a basis for certifying the respective States, Territories, or Puerto Rico to receive Federal funds, assistance in coordinating the research of the various stations and the research of the stations with that of the Department, reporting annually to the Secretary and the Congress on the work and expenditures under the Act, and close advisory relations with the State, Territorial, and Puerto Rican stations. During the fiscal year 1938 there were 695 active Bankhead-Jones projects, of which 203 were new or revised.

Administration of the payments to States authorized by the Bankhead-Jones Act differs from administration of the other Acts on a number of points, including the following:

(a) No allotment of Bankhead-Jones funds can be made to a State, Territory, or Puerto Rico in excess of the amount the State, Territory, or Puerto Rico makes available from other than Federal funds for research during the year. The other Acts do not require the Federal funds to be offset by



the States. Enforcement of this provision requires not only annual administrative examination of the work and expenditures under the allotments under the Bankhead-Jones Act, but also annual administrative examination of the work and expenditures under an equal amount of funds made available by the States from other than Federal sources and advanced for offset credit. In 1939 it will be necessary to examine the work and expenditures made under the Bankhead-Jones allotments totaling \$2,100,000 and to examine State accounts also totaling \$2,100,000.

(b) As a part of their research offset, the States, Territories, and Puerto Rico may include expenditures during the year for physical plant and equipment necessary for the prosecution of research. This provision requires administrative responsibility to ascertain that expenditures for physical plant and equipment advanced for offset credit are necessary for research purposes.

(c) Under the terms of the Bankhead-Jones Act the funds authorized by the Act may be used for physical plant, including the purchase and rental of land, construction of buildings, and for the equipment and maintenance of such buildings without limitation as to the portion of the funds which may be used for these purposes. The expenditures, however, are limited to those necessary for the research under this Act. Administration of this provision is an important responsibility in addition to those required under the other Acts.

2. Special Research Projects, Department of Agriculture.--Forty-eight percent of the Special Research Fund is available to the Secretary of Agriculture for the major objective of enabling him to undertake "research into laws and principles underlying basic problems of agriculture in its broadest aspects. The work under this head includes planning, programming, coordinating, and the carrying out of such special research projects as the Secretary may authorize to be undertaken under this fund in a way to effectively integrate this research with research and other activities provided for in the regular appropriations to the Department. The Act requires that the research under this fund "shall be in addition to research provided for under existing law (but both activities shall be coordinated as far as practicable) and shall be conducted by such agencies of the Department of Agriculture as the Secretary may designate or establish."

The various bureaus of the Department cooperate in bringing before the Secretary problems suitable for research under the provisions of the Bankhead-Jones Act. From the combined suggestions and recommendations, the Secretary, with such advisory assistance as he may call for, selects the problems for research. These problems are assigned to a bureau, or bureaus, or to a group of specialists, for development of plans and estimates for the consideration of the Secretary before final decision is made as to the research to be undertaken. The projects finally decided upon are assigned to an existing bureau or bureaus, along with an allotment of funds to each bureau. A written project is prepared outlining the research to be undertaken and submitted for approval by the Secretary as required by the Act.

The Office of Experiment Stations is responsible for the development of the program for presentation to the Secretary for general assistance in planning, directing, and supervising the work and for the administration of





the funds in accordance with the provisions of the Act. The planning of projects includes consideration of the entire Departmental organization, as to the agencies which can contribute effectively to the solution of the questions involved through active participation in the studies or through consultation in an advisory capacity. There are now under way 52 projects involving eleven bureaus. Many of the projects are cooperative as between bureaus. As many as three bureaus and seven State experiment stations are cooperating in a single project in an effort to coordinate the work with research provided for by other funds as specified in the Act and in order to take advantage of available technical assistance, physical plant facilities, and local knowledge of the subject of the investigations.

The nature of the problems are such that helpful cooperation can be obtained from the State experiment stations on a number of the major projects, and such that a large percentage of this fund has been expended outside of Washington. Some of the more highly technical laboratory investigations, while in the interest of agriculture in its broad aspects, are centered in Washington because they can be conducted more effectively and more economically in the laboratories here.

3. Special Research Laboratories in Major Agricultural Regions.--The Bankhead-Jones Act provides that the Secretary of Agriculture shall use one-half of the Special Research Fund for the establishment and maintenance of research laboratories and facilities and for research as described by the Act at such laboratories, located at places selected by the Secretary in major agricultural regions. The work under this item involves decision as to problems for which laboratories should be established and planning the research program for each laboratory; the working out of relationships with the State experiment stations in each of the major agricultural regions in order to coordinate the work of each laboratory with related work under regular Federal and State activities; and carrying forward the research program finally approved.

The general plan is to secure from the directors of State experiment stations and the chiefs of bureaus in the Department suggestions and recommendations as to laboratories to be established. With this information available, the Secretary, with such assistance as he may call for, decides upon the laboratory projects to be undertaken and the agencies of the Department to which the responsibility for each laboratory and the research work will be assigned. The plan of establishment and operation of the laboratories has been designed to effect the greatest possible coordination of the research of the laboratories with the regular activities of the Department and the work of the State experiment stations.

Eight regional laboratories have been established under this project with the State experiment stations of each region and the pertinent subject-matter bureau or bureaus of the Department participating in the work of each laboratory, as follows: (1) A laboratory for research into the heredity and behavior of vegetable crop plants for the development of improved varieties having superior adaptation to the southeastern region; (2) a laboratory for the study of the mechanism of infection in the contagious, infectious, and parasitic diseases of domestic animals and poultry, and methods of control in the southeastern region; (3) a laboratory for research into laws and principles underlying pasture improvement in the northeastern region;





(4) a laboratory for research to improve the viability of poultry in the northeast and north-central regions; (5) a laboratory for research into the industrial utilization of the soybean and soybean products in the north-central region; (6) a laboratory for research on the improvement of swine through the application of breeding methods in the north-central region; (7) a laboratory for the improvement of sheep for western ranges through the application of breeding methods for the far western region; (8) a laboratory for investigations of the relationships of the salinity of irrigation waters, and of soil conditions, to plant growth and related factors involved in a permanently successful irrigated agriculture in the western region. In addition to maintaining the laboratories already established, plans are under way for one additional laboratory to be established during 1939.

The Office of Experiment Stations is responsible for the development of the laboratory programs, in cooperation with the bureaus and State stations, to be presented for the consideration of the Secretary, for assistance in the general planning of the work and the development of effective relationships at each laboratory, and for the administration of the laboratories in accordance with the terms of the act.

#### PASSENGER-CARRYING VEHICLES

It is estimated that five passenger-carrying automobiles will be required in the fiscal year 1940 in connection with the work conducted under the Special Research Fund, three for regional laboratory projects under Section 4 of the Bankhead-Jones Act of June 29, 1935, and two for projects under Section 1 of the Act. One of the automobiles to be purchased for regional laboratory projects is to replace an automobile which has been in constant use since 1936. The cars to be purchased, of course, are subject to the limitation of \$750 maximum cost applicable to the Government as a whole.

At least one car is essential for each regional laboratory to enable the technical men to visit the different parts of the region, including the State experiment stations located therein, all of which are cooperating in the laboratory projects of their region. In the case of laboratories established in the larger regions covering a wide area, those involving extensive cooperative relationships and those including the work of more than one bureau, two or more cars may be required to enable the technical men to visit the different parts of the region. Automobile transportation is also necessary in connection with field projects conducted under this fund in the case of those investigations for which common carriers are not available, are impracticable, or are less economical.

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## EXTENSION SERVICE

### Payments to States, Hawaii, Alaska, and Puerto Rico for Agricultural Extension Work.

#### General Statement

As shown by Table 1, on the following page, funds available in 1939 for direct payments to the States, Hawaii, Alaska, and Puerto Rico for cooperative agricultural extension work total \$17,917,583. In addition, there was available \$50,540 from an appropriation direct to the Department of Agriculture ("Cooperative farm forestry extension work"), making a grand total of \$17,968,123 available to the States and Territories for 1939. As shown also by Table 1, the Budget Estimates for 1940 provide for total appropriations of \$18,340,643 for these purposes, involving a net increase of \$372,520 as compared with 1939. The increases and decreases in various appropriation items are discussed on succeeding pages.

With the exception of funds provided under the Clarke-McNary Forestry Act of 1924, which are disbursed directly by the Department, Federal funds for cooperative agricultural extension work are allotted and paid over to the States, Hawaii, Alaska, and Puerto Rico in accordance with the provisions of the several different basic authorization acts. These acts authorize specific amounts for payment outright under each appropriation item and the basis of distribution of the remaining payments is rural population in the case of (1) the original cooperative extension act or the Smith-Lever Act of 1914, (2) the Capper-Ketchum Act of 1928, and (3) the Alaska Act of 1929, whereas farm population is the basis of distribution of the remaining payments under the Bankhead-Jones Act of 1935. The allotment of funds available to the States and Territories under the Clarke-McNary Forestry Act of 1924 is made by the Secretary on the basis of cooperative agreements.

The use of all these funds is indicated in greater detail in Tables 1, 2, 3, 4, and 5. Table 1 is a summary of all the funds. Table 2 indicates the funds paid to the States and Territories which require offset by State, county, or local funds, those where such offset is not required, and the basis of allotment. Table 3 shows, by States, the allotments for direct payment to States for 1939 and 1940 as contemplated by the Budget estimate. Table 4 shows, by States, Federal funds and funds arising from sources within the respective States. Table 5 shows the various classes of field agents employed with extension funds.



Table 1.

Statement showing appropriation items and amounts available to the States in 1939 and estimated for 1940.

| Item   | Appropriation,<br>1939 | Budget<br>estimate,<br>1940 | Increase<br>or<br>decrease |
|--|------------------------|-----------------------------|----------------------------|
| <u>Payments to States, Hawaii, Alaska,<br/>and Puerto Rico for agricultural<br/>extension work:</u>    |                        |                             |                            |
| <u>Permanent Specific Appropriation:</u>   |                        |                             |                            |
| <u>Smith-Lever Act</u> .....   | \$4,701,165            | \$4,701,165                 | - -                        |
| <u>Agricultural Appropriation Act:</u>   |                        |                             |                            |
| Capper-Ketcham Act.....  | 1,480,000              | 1,480,000                   | - -                        |
| Section 21, Bankhead-Jones Act....   | 11,000,000             | 12,000,000                  | +\$1,000,000(1)            |
| Alaska Acts.....   | 21,418                 | 21,418                      | - -                        |
| Puerto Rico Act.....   | 45,000                 | 45,000                      | - -                        |
| Supplementary cooperative extension<br>work.....   | 395,000                | - -                         | -395,000(2)                |
| Additional cooperative extension<br>work.....  | 275,000                | - -                         | -275,000(3)                |
| <u>Total, Agricultural Appropriation Act</u>   | <u>13,216,418</u>      | <u>13,546,418</u>           | <u>+ 330,000</u>           |
| <u>Total payments made directly to<br/>States and Territories</u> .....                                | <u>17,917,583</u>      | <u>18,247,583</u>           | <u>+ 330,000</u>           |
| <u>Amounts allotted to States and<br/>Territories, but disbursed by<br/>Department of Agriculture:</u> |                        |                             |                            |
| Cooperative farm forestry extension<br>work.....   | 50,540                 | 93,060                      | + 42,520(4)                |
| <u>Total direct payments and Department<br/>allotments to States and Territories</u> .....             | <u>17,968,123</u>      | <u>18,340,643</u>           | <u>+ 372,520</u>           |

- (1) \$1,000,000 increase in direct payments to States and Hawaii, as authorized for 1940 by section 21 of the Bankhead-Jones Act (7 U.S.C. 343c).
- (2) \$395,000 decrease in direct payments to the States and Hawaii.
- (3) \$275,000 decrease in direct payments to the States and Hawaii.
- (4) \$42,520 increase in State allotments disbursed by the Department of Agriculture under section 5 of the Clarke-McNary Forestry Act of June 7, 1924 (16 U.S.C. 564-570).

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Table 2.

Statement of direct payments to States, Hawaii, Alaska, and Puerto Rico, indicating those requiring offset by States and Territories, those not requiring such offset, and basis of distribution, as estimated for 1940.

| Item  | Total estimate, 1940 | Amount to be paid without offset | Amount requiring offset and basis of allotment |                       |
|---|----------------------|----------------------------------|--|-----------------------|
|   |                      |                                  | Amount   | Basis of distribution |
| (1) Permanent annual appropriation (Smith-Lever Act)...                           | \$4,701,165          | \$500,000(a)                     | \$4,201,165                                    | Rural population      |
| (2) Capper-Ketcham extension work.....  | 1,480,000            | 980,000(b)                       | 500,000  | " "                   |
| (3) Extension work, section 21, Bankhead-Jones Act.....                           | 12,000,000           | 12,000,000(c)                    | - -  | Farm population       |
| (4) Alaska.....   | 21,418               | 17,500(d)                        | 3,918  | Rural population      |
| (5) Puerto Rico.....  | 45,000               | 45,000                           | - -  | Specified by law      |
| Total, direct Federal payments to the States, Hawaii, Alaska and Puerto Rico..... | 18,247,583           | 13,542,500                       | 4,705,083                                      |                       |

(a) \$10,000 to each State, Hawaii, and Puerto Rico.

(b) \$20,000 to each State and Hawaii.

(c) \$20,000 to each State and Hawaii (balance based on farm population).

(d) \$10,000 to Alaska (Act of F.b. 23, 1929).

7,500 to Alaska (Act of June 20, 1936).

#### Funds from other sources

The Federal funds for cooperative agricultural extension work are supplemented by funds from within the States estimated at \$14,148,201.58, thus making available from Federal, State, and local sources for extension work during 1939, a sum approximating \$32,116,324.25. (See Table 4.)



Table 3.  
DIRECT PAYMENTS TO STATES,  
FEDERAL FUNDS FOR COOPERATIVE AGRICULTURAL EXTENSION WORK

| State               | Appropriation,<br>1939 | Budget Estimate,<br>1940 | Increase or<br>decrease |
|---------------------|------------------------|--------------------------|-------------------------|
| Alabama.....        | \$665,176.87           | \$695,062.82             | +\$29,885.95            |
| Arizona.....        | 117,007.52             | 110,053.21               | -6,954.31               |
| Arkansas.....       | 552,972.73             | 578,790.37               | +25,817.64              |
| California.....     | 393,801.95             | 402,987.96               | +9,186.01               |
| Colorado.....       | 211,339.38             | 195,908.52               | -15,430.86              |
| Connecticut.....    | 129,872.50             | 121,834.02               | -8,038.48               |
| Delaware.....       | 75,920.25              | 76,598.09                | +677.84                 |
| Florida.....        | 219,435.74             | 210,971.77               | -8,463.97               |
| Georgia.....        | 701,088.29             | 732,718.71               | +31,630.42              |
| Idaho.....          | 154,230.01             | 144,777.74               | -9,452.27               |
| Illinois.....       | 562,151.78             | 580,215.90               | +18,064.12              |
| Indiana.....        | 449,955.83             | 465,972.67               | +16,016.84              |
| Iowa.....           | 508,488.28             | 529,534.33               | +21,046.05              |
| Kansas.....         | 389,385.57             | 402,975.92               | +13,590.35              |
| Kentucky.....       | 603,553.18             | 628,720.60               | +25,167.42              |
| Louisiana.....      | 439,528.96             | 457,396.85               | +17,867.89              |
| Maine.....          | 156,068.80             | 152,226.44               | -3,842.36               |
| Maryland.....       | 195,339.36             | 191,597.15               | -3,742.21               |
| Massachusetts.....  | 137,235.65             | 130,105.54               | -7,130.11               |
| Michigan.....       | 448,989.16             | 463,291.99               | +14,302.83              |
| Minnesota.....      | 464,274.41             | 483,977.82               | +19,703.41              |
| Mississippi.....    | 651,140.29             | 683,452.30               | +32,312.01              |
| Missouri.....       | 579,039.79             | 602,511.47               | +23,471.68              |
| Montana.....        | 173,799.74             | 154,127.64               | -19,672.10              |
| Nebraska.....       | 343,761.17             | 337,077.63               | -6,683.54               |
| Nevada.....         | 73,181.21              | 60,754.64                | -12,426.57              |
| New Hampshire.....  | 93,202.53              | 89,050.82                | -4,151.71               |
| New Jersey.....     | 171,132.86             | 157,183.45               | -13,949.41              |
| New Mexico.....     | 142,486.20             | 134,155.31               | -8,330.89               |
| New York.....       | 477,310.10             | 485,727.68               | +8,417.58               |
| North Carolina..... | 792,697.00             | 827,714.56               | +35,017.56              |
| North Dakota.....   | 247,952.02             | 241,533.65               | -6,418.37               |
| Ohio.....           | 580,120.65             | 597,585.91               | +17,465.26              |
| Oklahoma.....       | 531,272.54             | 553,222.22               | +21,949.68              |
| Oregon.....         | 186,961.05             | 170,176.47               | -16,784.58              |
| Pennsylvania.....   | 617,770.48             | 623,114.05               | +5,343.57               |
| Rhode Island.....   | 60,223.24              | 60,380.95                | +157.71                 |
| South Carolina..... | 476,878.98             | 496,824.02               | +19,945.04              |
| South Dakota.....   | 259,912.11             | 238,503.04               | -21,409.07              |
| Tennessee.....      | 607,436.19             | 634,573.99               | +27,137.80              |
| Texas.....          | 1,138,696.81           | 1,190,437.41             | +51,740.60              |
| Utah.....           | 121,037.50             | 112,302.04               | -8,735.46               |
| Vermont.....        | 112,749.46             | 111,227.63               | -1,521.83               |
| Virginia.....       | 513,017.26             | 532,118.69               | +19,101.43              |
| Washington.....     | 218,624.73             | 217,718.49               | -906.24                 |
| West Virginia.....  | 311,820.34             | 317,445.82               | +5,625.48               |
| Wisconsin.....      | 466,905.12             | 485,565.21               | +18,660.09              |
| Wyoming.....        | 108,617.22             | 89,620.74                | -18,996.48              |
| Alaska.....         | 21,418.00              | 21,418.00                | -                       |
| Hawaii.....         | 122,532.86             | 126,271.42               | +3,738.56               |
| Puerto Rico.....    | 140,069.00             | 140,069.00               | -                       |
| Total               | 17,917,582.67          | 18,247,582.67            | +330,000.00             |

[The page contains two columns of extremely faint, illegible text, likely bleed-through from the reverse side of the document. The text is too light to transcribe accurately.]

Table 4. Total allotments to States and Territories from Federal (including U.S.D.A.) and State sources for extension work, fiscal year 1939.

| State               | Total         | Total Federal funds | Total within the States |
|---------------------|---------------|---------------------|-------------------------|
| Alabama.....        | \$952,596.87  | \$666,796.87        | \$285,800.00            |
| Arizona.....        | 180,281.52    | 117,007.52          | 63,274.00               |
| Arkansas.....       | 869,782.73    | 552,972.73          | 316,810.00              |
| California.....     | 972,564.00    | 395,421.95          | 577,142.05              |
| Colorado.....       | 363,219.38    | 212,239.38          | 150,980.00              |
| Connecticut.....    | 301,286.40    | 130,892.50          | 170,393.90              |
| Delaware.....       | 94,134.78     | 75,920.25           | 18,214.53               |
| Florida.....        | 411,135.51    | 219,435.74          | 191,699.77              |
| Georgia.....        | 1,055,806.89  | 702,708.29          | 352,898.60              |
| Idaho.....          | 278,997.40    | 155,850.01          | 123,147.39              |
| Illinois.....       | 1,104,409.21  | 563,771.78          | 540,637.43              |
| Indiana.....        | 953,453.77    | 451,575.83          | 481,877.94              |
| Iowa.....           | 1,149,957.51  | 510,108.28          | 639,849.23              |
| Kansas.....         | 910,444.80    | 390,405.57          | 520,039.23              |
| Kentucky.....       | 886,769.18    | 603,553.18          | 283,216.00              |
| Louisiana.....      | 723,203.96    | 441,148.96          | 282,055.00              |
| Maine.....          | 235,644.87    | 156,068.80          | 79,576.07               |
| Maryland.....       | 377,618.50    | 196,959.36          | 130,659.14              |
| Massachusetts.....  | 488,581.25    | 138,855.65          | 349,725.60              |
| Michigan.....       | 821,993.16    | 450,609.16          | 371,384.00              |
| Minnesota.....      | 756,929.27    | 465,894.41          | 291,034.86              |
| Mississippi.....    | 995,604.29    | 652,760.29          | 342,844.00              |
| Missouri.....       | 871,560.93    | 579,039.79          | 292,521.14              |
| Montana.....        | 353,478.67    | 174,599.74          | 178,878.93              |
| Nebraska.....       | 654,326.47    | 345,381.17          | 308,942.30              |
| Nevada.....         | 126,301.21    | 73,181.21           | 53,120.00               |
| New Hampshire.....  | 230,237.16    | 94,822.53           | 135,414.63              |
| New Jersey.....     | 448,726.62    | 172,752.86          | 275,973.76              |
| New Mexico.....     | 280,546.20    | 142,436.20          | 138,060.00              |
| New York.....       | 1,770,765.84  | 478,930.10          | 1,291,835.74            |
| North Carolina..... | 1,179,014.00  | 794,317.00          | 384,697.00              |
| North Dakota.....   | 392,932.02    | 249,212.02          | 143,720.00              |
| Ohio.....           | 1,029,140.65  | 581,560.65          | 447,580.00              |
| Oklahoma.....       | 857,672.54    | 531,272.54          | 326,400.00              |
| Oregon.....         | 501,460.00    | 186,961.05          | 314,498.95              |
| Pennsylvania.....   | 1,041,007.48  | 619,030.48          | 421,977.00              |
| Rhode Island.....   | 81,412.98     | 60,223.24           | 21,189.74               |
| South Carolina..... | 669,163.74    | 476,878.98          | 192,284.76              |
| South Dakota.....   | 339,048.10    | 259,912.11          | 79,135.99               |
| Tennessee.....      | 878,822.61    | 609,056.19          | 269,760.42              |
| Texas.....          | 1,963,711.30  | 1,140,316.81        | 823,394.49              |
| Utah.....           | 201,191.50    | 122,117.50          | 79,074.00               |
| Vermont.....        | 210,769.46    | 114,369.46          | 96,400.00               |
| Virginia.....       | 901,259.26    | 514,637.26          | 386,622.00              |
| Washington.....     | 297,560.49    | 218,624.73          | 78,935.76               |
| West Virginia.....  | 495,886.84    | 313,440.34          | 182,446.50              |
| Wisconsin.....      | 788,876.12    | 408,525.12          | 320,351.00              |
| Wyoming.....        | 196,804.00    | 109,877.22          | 86,926.78               |
| Alaska.....         | 27,418.00     | 21,418.00           | 6,000.00                |
| Hawaii.....         | 168,673.41    | 122,532.86          | 46,140.55               |
| Puerto Rico.....    | 294,344.40    | 141,689.00          | 152,655.40              |
| Total.....          | 32,116,324.25 | 17,968,122.67       | 14,148,201.58           |





As the major purpose of these payments to States is for the employment of extension workers in counties and colleges, the following comparative statement is submitted showing agents employed:

Table 5. Extension field agents employed June 30, 1935, 1936, 1937, and 1938.

|   | June 30,<br>1935 | June 30,<br>1936 | June 30,<br>1937 | June 30,<br>1938 |
|---|------------------|------------------|------------------|------------------|
| State Supervisors.....                      | 539              | 621              | 632              | 624              |
| <u>Subject-Matter Specialists:</u>          |                  |                  |                  |                  |
| Full-time specialists.....                  | 860              | 1,087            | 1,152            | 1,198            |
| Part-time specialists.....                  | 306              | 341              | 307              | 353              |
| Special A.A.A. State workers                | 95               | 18               | 8                | - -              |
| Total specialists.....                      | 1,261            | 1,446            | 1,467            | 1,551            |
| Total with headquarters at<br>colleges..... | 1,800            | 2,067            | 2,099            | 2,175            |
| <u>County Workers:</u>                      |                  |                  |                  |                  |
| Agricultural agents.....                    | 3,290            | 3,701            | 3,809            | 3,825            |
| Home demonstration agents...                | 1,309            | 1,688            | 1,845            | 1,894            |
| Boys' and girls' club agents                | 244              | 315              | 360              | 337              |
| Negro extension agents.....                 | 326              | 396              | 416              | 451              |
| Special A.A.A. county workers               | 889              | 623              | 621              | 595              |
| Total county workers.....                   | 6,058            | 6,723            | 7,051            | 7,102            |
| Total.....                                  | 7,858            | 8,790            | 9,150            | 9,277            |

|  |       |
|--|-------|
| Number of counties in United States.....                             | 3,147 |
| Approximate number of counties now having one or<br>more agents..... | 2,953 |

A discussion of the activities under the various appropriation items follows.

(a) SUPPLEMENTARY COOPERATIVE EXTENSION WORK  
(Supplementary Smith-Lever appropriation)

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$395,000      |
| Budget Estimate, 1940.....   | - - -          |
| Decrease.....                | <u>395,000</u> |



## PROJECT STATEMENT

| Project   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Decrease       |
|---|-----------|---------------------|---------------------|----------------|
| Payments to States and Hawaii for cooperative agricultural extension work (Supplementary cooperative extension work)..... | \$790,000 | \$395,000           | - - -               | -\$395,000 (1) |

## DECREASE

(1) The reduction of \$395,000 in this item for 1940 will eliminate this appropriation for direct payments to States and Hawaii for cooperative agricultural extension work. It has been the policy to reduce this item each year since 1936 as a partial offset to the annual increment under funds authorized by Sec. 21 of the Bankhead-Jones Act of 1935.

## WORK UNDER THIS APPROPRIATION

These funds have for a number of years supplemented the permanent annual appropriation provided under the Smith-Lever Act of May 8, 1914 (7 U.S.C. 341-348). Like the Smith-Lever funds, they are paid directly to the State colleges of agriculture as Federal aid for the promotion of extension work in agriculture and home economics. This appropriation is divided among the States and Hawaii on the basis of rural population and the funds are required to be met dollar for dollar.

The State allotments are paid directly to a designated officer in each State and are disbursed in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Secretary of Agriculture. Expenditures by the States from this and other cooperative extension appropriations are subject to an annual inspection by representatives of the Department.

## (b) CAPPER-KETCHAM EXTENSION WORK

Appropriation Act, 1939..... \$1,480,000  
 Budget Estimate, 1940..... 1,480,000

## PROJECT STATEMENT

| Project   | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-------------|---------------------|---------------------|
| Payments to States and Hawaii for further development of cooperative agricultural extension work (Copper-Ketcham extension work)..... | \$1,480,000 | \$1,480,000         | \$1,480,000         |



## WORK UNDER THIS APPROPRIATION

This appropriation, which is specifically authorized by the Capper-Ketcham Act of May 22, 1928 (7 U.S.C. 343a, 343b), provides for the further development of agricultural extension work and supplements the permanent annual appropriation provided under the Smith-Lever Act of May 8, 1914 (7 U.S.C. 341-348). The Capper-Ketcham Act authorizes an appropriation of \$980,000 to be divided at the rate of \$20,000 to each State and to Hawaii, without requirement for State and Territorial offset; and an additional \$500,000 to be divided among the States and Hawaii on the basis of rural population, the allotments from this additional \$500,000 to be met dollar for dollar by the States or Territory before the money becomes available. The Act further provides that at least 80 percent of the funds appropriated under this authorization shall be expended for salaries of county extension agents and that the extension agents appointed under its provisions shall be men and women in fair and just proportions.

The State allotments are paid directly to a designated officer in each State and are disbursed by the States in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Secretary of Agriculture. Expenditures by the States from this and other cooperative extension appropriations are subject to annual inspection by representatives of the Department.

## (c) EXTENSION WORK, SECTION 21, BANKHEAD-JONES ACT

|                              |                  |
|------------------------------|------------------|
| Appropriation Act, 1939..... | \$11,000,000     |
| Budget Estimate, 1940.....   | 12,000,000       |
| Increase.....                | <u>1,000,000</u> |

## PROJECT STATEMENT

| Project   | 1938         | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase        |
|---|--------------|---------------------|---------------------|-----------------|
| Payments to States and Hawaii for cooperative agricultural extension work (Extension work, section 21, Bankhead-Jones Act.....) | \$10,000,000 | \$11,000,000        | \$12,000,000        | +\$1,000,000(1) |

## INCREASE

(1) The increase of \$1,000,000 in this item for 1940 represents the final annual increment authorized for extension work under section 21, title II, of the Bankhead-Jones Act of June 29, 1935 (7 U.S.C. 343c), to bring this fund to maturity. The amount requested, \$12,000,000, is the maximum annual amount authorized for cooperative agricultural extension work under the provisions of section 21, title II, of the Bankhead-Jones Act of June 29, 1935 (7 U.S.C. 343c). Funds to provide for additional personnel and other purposes are needed in the various States and Hawaii for the expansion of extension work and to enable the extension services in the States to further cooperate





with the various Federal agencies conducting programs for rural people, particularly in educational work designed to inform rural people of these programs.

#### WORK UNDER THIS APPROPRIATION

This appropriation is specifically authorized by the provisions of section 21, title II, of the Bankhead-Jones Act of June 29, 1935 (7 U.S.C. 343c), and augments the cooperative agricultural extension funds provided by the Smith-Lever Act of 1914, the Capper-Ketcham Act of May 22, 1928, and supplementary extension appropriations. For the fiscal year 1936 the amount authorized for this purpose by the Act was \$8,000,000, with provision for cumulative annual increments of \$1,000,000 thereafter for each of the following four years, until the total amount has reached \$12,000,000 in the fiscal year 1940, and continuing thereafter in that annual amount. While no State offset is required for the funds under this Act, these funds are available to the States only after they have met the required State offset to funds provided under the permanent Smith-Lever Act, the Capper-Ketcham Act, and supplementary cooperative extension work appropriations.

Under section 21 of the Bankhead-Jones Act, a straight allotment of \$20,000 is made to each State and Hawaii. The remainder of the fund is then allotted to each State and Hawaii on the basis of farm population. This fund is used in conjunction with other extension funds for the support of the agricultural extension system and has been effective in enlarging the scope of the work to include the educational phases of more recently established Federal agencies.

The State allotments are paid directly to a designated officer in each State and are disbursed by the States in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Secretary of Agriculture. Expenditures by the State from this and other cooperative extension appropriations are subject to annual inspection by representatives of the Department.

#### (d) ALASKA

Appropriation Act, 1939..... \$21,418  
Budget Estimate, 1940..... 21,418

#### PROJECT STATEMENT

| Project  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. Extension of the Smith-Lever Act to Alaska (Act of Feb. 23, 1929).....    | \$13,918 | \$13,918            | \$13,918            |
| 2. Extension of the Capper-Ketcham Act to Alaska (Act of June 20, 1936)..... | 5,000    | 7,500               | 7,500               |
| Total appropriation.....   | 18,918   | 21,418              | 21,418              |



## WORK UNDER THIS APPROPRIATION

General.-- Extension work in agriculture and home economics in Alaska is similar in character to that conducted in the States, modifications being made to suit local conditions. In agriculture it includes gardening, some dairying, fur production, and marketing. In home economics there is a wide field for home improvement, due to somewhat pioneer conditions of many Alaskan homes. The 4-H club work with boys and girls is stressed along the lines of both agriculture and home economics. These Federal funds are paid directly to a designated officer in the Territory and are disbursed in accordance with budgets and plans of work submitted by the director of extension and approved by the Secretary of Agriculture. Expenditures are subject to inspection by representatives of the Department. The provisions of the Smith-Lever Act of 1914 and the Capper-Ketcham Act of 1928 were extended to Alaska by special Acts of Congress to provide for cooperative agricultural extension work in the Territory, as follows:

1. Extension of the Smith-Lever Act to Alaska (Act of Feb. 23, 1929). -- The extension of the Smith-Lever Act to Alaska is specifically authorized by the Act approved February 23, 1929 (7 U.S.C. 386c). Under the provisions of this Act, \$10,000 is appropriated annually to Alaska without requirement of Territorial offset, and the remainder, \$3,918, must be matched by Territorial funds used for extension work. Experiment stations have been maintained in Alaska for many years, but cooperative agricultural extension work was not systematically begun among farmers in the Territory until 1931.

2. Extension of the Capper-Ketcham Act to Alaska (Act of June 20, 1936). -- Funds provided under the Act of February 23, 1929, were supplemented by the extension of the Capper-Ketcham Act to Alaska as specifically authorized by an Act approved June 20, 1936 (7 U.S.C. 343c). Under the provisions of this Act, \$2,500 was authorized for the fiscal year 1937, to be increased on recommendation of the Secretary of Agriculture by this amount annually until a total of \$10,000 is reached. No appropriation was made for the fiscal year 1937 but \$5,000 was appropriated under this Act for the fiscal year 1938 and \$7,500 for the fiscal year 1939. The Act also provides that the several established judicial divisions of Alaska, as the same shall exist from time to time, shall be considered as counties for the purpose of complying with the provisions of the Act until a subdivision of the Territory into counties is effected. No Territorial offset is required for any of the funds under the Act approved June 20, 1936.

## (a) PUERTO RICO

Appropriation Act, 1939..... \$45,000  
 Budget Estimate, 1940..... 45,000

## PROJECT STATEMENT

| Project   | 1938 | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|------|---------------------|---------------------|
| Payments to Puerto Rico for extension of section 21, Bankhead-Jones Act to Puerto Rico (Puerto Rico)..... | - -  | \$45,000            | \$45,000            |



## WORK UNDER THIS APPROPRIATION

The Act approved August 28, 1937 (7 U.S.C. 343f, 343g), authorizes the extension of section 21 of the Bankhead-Jones Act of 1935 to Puerto Rico, with the provision that the amounts to be paid to Puerto Rico are authorized without diminution of the amounts authorized for payment to the States and the Territory of Hawaii in section 21 of the original act. This Act authorizes an appropriation for payment of \$88,000 to Puerto Rico for the first fiscal year following enactment (i.e., 1939), with annual increments of \$40,000 thereafter until the total reaches \$408,000, and to continue annually thereafter in that amount.

The funds provided under the Act of August 28, 1937, augment the co-operative agricultural extension appropriations allotted to Puerto Rico (\$95,069) under the permanent Smith-Lever Act approved May 8, 1914 (7 U.S.C. 341-348), as amended by the Act of March 4, 1931 (7 U.S.C. 386d-386f), extending its benefits to Puerto Rico. The funds are available to Puerto Rico only after the Island has met the required offset to funds allotted under the permanent Smith-Lever Act.

The Extension Service of Puerto Rico is responsible for bringing to all rural people of the Island the latest information regarding agriculture and home economics and to help them adopt improved methods and practices in the production and marketing of crops and livestock, the growing of gardens and other home food supplies, the preservation of food, adequate diets for health, improved sanitation, the development of community life, and other activities to promote higher standards of living. The Extension Service also has the responsibility for extending training and benefits provided through 4-H club work.

The Territorial allotments are paid directly to a designated officer and are disbursed in accordance with budgets and programs of work submitted by the Director of extension of Puerto Rico and approved by the Secretary of Agriculture. Expenditures by Puerto Rico from this and other cooperative extension appropriations are subject to inspection by representatives of the Department.

## (f) ADDITIONAL COOPERATIVE EXTENSION WORK

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$275,000      |
| Budget Estimate, 1940.....   | - -            |
| Decrease.....                | <u>275,000</u> |

## PROJECT STATEMENT

| Project   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Decrease      |
|---|-----------|---------------------|---------------------|---------------|
| Payments to States and Hawaii for additional cooperative extension work (Additional cooperative extension work) | \$500,000 | \$275,000           | - -                 | -\$275,000(1) |





## DECREASE

(1) The reduction of \$275,000 in this item for 1940 will eliminate this appropriation for direct payments to States and Hawaii for additional cooperative extension work. It has been the policy to reduce this item each year since 1936 as a partial offset to the annual increment under funds authorized by Sec. 21 of the Bankhead-Jones Act.

## WORK UNDER THIS APPROPRIATION

These funds supplement the permanent specific appropriation provided under the Smith-Lever Act, approved May 8, 1914 (7 U.S.C. 341-348), as well as those provided under the Capper-Ketcham Act, approved May 22, 1928 (7 U.S.C. 343a, 343b). The appropriation has provided for an expansion of the cooperative extension work, including the employment of specialists in economics and marketing. These funds are allotted by the Secretary of Agriculture to the several States and the Territory of Hawaii in such amounts as he may deem necessary to accomplish such purposes. They are also paid directly to the State colleges of agriculture as Federal aid for the promotion of extension work in agriculture and home economics. However, payments under these funds to the States, instead of being based upon rural population, have been subject to determination by the Secretary of Agriculture as to the amount that he deemed necessary to accomplish the best results in each State.

The State allotments have been paid directly to a designated officer in each State and disbursed by the States in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Secretary of Agriculture. Expenditures by the States from this and other cooperative extension appropriations have been subject to annual inspection by representatives of the Department.

(g) IN ALL, PAYMENTS TO STATES, etc.

Change in Language

It is recommended that the language of this paragraph be amended by inserting after the words "In all, payments to States, Hawaii, Alaska, and Puerto Rico for agricultural extension work," the following:

"to be accounted for as one fund"

For explanation of this change see general note in these Justifications under Office of Experiment Stations, page 54.

Direct Appropriations to the Department

## (h) GENERAL ADMINISTRATIVE EXPENSES

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$126,246      |
| Budget Estimate, 1940.....   | <u>126,246</u> |



## PROJECT STATEMENT

| Project  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-----------|---------------------|---------------------|
| General administration and business service..... | \$123,313 | \$126,246           | \$126,246           |
| Unobligated balance.....                         | 2,933     | - -                 | - -                 |
| Total appropriation.....                         | 126,246   | 126,246             | 126,246             |

## WORK UNDER THIS APPROPRIATION

This appropriation provides personnel and funds essential to the proper supervision and general business operations of the Extension Service.

## (i) FARMERS' COOPERATIVE DEMONSTRATION WORK

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$545,170      |
| Budget Estimate, 1940.....   | <u>575,170</u> |
| Increase.....                | <u>30,000</u>  |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase     |
|---|-----------|---------------------|---------------------|--------------|
| 1. Technical advice and assistance in subject-matter fields to State extension forces.....                                | \$384,703 | \$374,170           | \$404,170           | +\$30,000(1) |
| 2. Studies of extension methods and assistance in training courses for State extension forces                             | 68,726    | 78,500              | 78,500              | - -          |
| 3. Preparation and distribution of visual material and extension literature to Department and State extension forces..... | 80,020    | (a) 92,500          | 92,500              |              |
| Unobligated balance....   | 21,221    | - -                 | - -                 | - -          |
| Total appropriation.  | 554,670   | (a) 545,170         | 575,170             | +30,000      |

(a) Includes \$200 transferred to Bureau of Standards, Department of Commerce for research on photographic work.



## INCREASE

(1) The increase of \$30,000 in this item for 1940 under the project "Technical advice and assistance in subject-matter fields to State extension forces" is recommended for expanding the staff of the Washington office to enable the Department to develop and disseminate information more fully along the lines of agricultural production and agricultural economics in land-use planning to meet more adequately the needs of farm people in developing, coordinating, and carrying out production and economic programs of county, state, and national significance. The additional \$30,000, if granted, would be used as follows:

(a) An increase of \$17,800 for the purpose of strengthening the supervisory technical staff. The Extension Service is intimately concerned with all of the national agricultural programs. This increase will enable the Federal Extension Service to maintain closer contact with the agencies conducting these programs and to be constantly informed regarding objectives, procedures, and such modifications as may be made from time to time. The Extension Service will thereby be able to give greater assistance to the Department in advancing the national programs. Moreover, the Service will be able to give the State Extension Services more information and assistance in developing county, State, and regional programs, as well as to assist in the correlation of State and county extension programs with the national programs. Thus the largest possible returns to the public may be obtained from Federal expenditures for agriculture.

(b) An increase of \$12,200 for the purpose of strengthening the staff of trained extension economists. This will make it possible for the Federal Extension Service to study and adapt information, obtained from State and local sources on economic and marketing situations and problems, to the development of long-time agricultural economic programs of national significance in co-operation with other agencies of the Department. Federal, State, and county extension workers need this information in order that they may better supply the demands of farmers for assistance in solving their economic problems and for information to help them avail themselves of the Federal aids to agriculture.

## WORK UNDER THIS APPROPRIATION

General.--This item provides funds for the administration and supervision of cooperative extension work conducted in continental United States and the Territories of Alaska, Hawaii, and Puerto Rico, the furnishing of technical advice and assistance to State Extension Services, and the maintenance of the necessary professional and clerical staff in the District of Columbia.

1. Technical advice and assistance in subject-matter fields to State extension forces. -- This project covers the cost of maintenance of a staff essential to the efficient field administration of extension work, the inspection of expenditures under Federal grants in various States, and the coordination of all extension work in the field. Supervisory subject-matter and economic specialists carry to the State extension services the findings of the research bureaus of the Federal Department and assist them to incorporate such facts in their State programs. They carry information of value also from State to State along the lines of agriculture and home economics.





2. Studies of extension methods and assistance in training courses for State extension forces. -- The work under this project is very essential as the Extension Service originates, plans, and conducts, in cooperation with other sections of the Federal extension service and the various State extension services, field and office studies aimed at the development of a scientific body of information which will aid in the further development of agricultural extension, home economics extension, and boys' and girls' 4-H club work, and increase the efficiency of extension workers engaged in these lines of work; promotes and assists the development of more adequate professional training of extension workers -- both for those planning to enter the work and for those already in the service; records and measures the accomplishments of the cooperative extension system; and analyzes and interprets the results obtained in terms of teaching activities and educational progress.

3. Preparation and distribution of visual material and extension literature to Department and State extension forces. -- Under this project the Extension Service maintains such activities as its photographic library, editorial unit, preparation of radio programs, writers for the preparation of special educational material, lantern slides and film strips, and similar informational functions. Service in connection with information and illustrative material is rendered to the approximately 8,500 extension field workers. All annual reports and similar data are prepared under this project.

#### SUPPLEMENTAL FUNDS

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Agricultural Adjustment Administration:</u>  |                             |                             |                 |
| (a) <u>Salaries and Expenses:</u> For technical assistance on Agricultural Adjustment marketing agreement programs.....   | \$8,000                     | \$8,000                     | \$8,500         |
| (b) <u>Payments for Agricultural Adjustment:</u> For assistance to State extension forces in completion of commodity programs, including back obligations....   | - -                         | - -                         | 29,943          |
| <u>Exportation and Domestic Consumption of Agricultural Commodities (Cotton Price Adjustment):</u> For special assistance to State extension forces in administering the cotton price adjustment plan.. | - -                         | - -                         | 6,245           |



## SUPPLEMENTAL FUNDS - Continued

| Projects   | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|--|-----------------------------|-----------------------------|-----------------|
| <u>Exportation and Domestic Consumption of Agricultural Commodities:</u>   |                             |                             |                 |
| For special assistance to State extension forces in administering the cotton program.....  | - -                         | - -                         | \$260,797       |
| <u>Conservation and Use of Agricultural Land Resources:</u>  |                             |                             |                 |
| For special assistants in nine Southern States engaged in handling details connected with the agricultural conservation program..... | - -                         | - -                         | 848,500         |
| For special assistance to State extension forces on agricultural conservation program planning.....                                  | \$62,500                    | \$62,500                    | 125,000         |
| For special assistants to display agricultural conservation exhibits.....  | 3,500                       | 3,500                       | 77              |
| Total, Conservation and Use of Agricultural Land Resources.....  | 66,000                      | 66,000                      | 973,577         |
| Total, Supplemental Funds (Direct Allotments).....   | 74,000                      | 74,000                      | 1,279,062       |

## (j) MOTION PICTURES

Appropriation Act, 1939..... \$79,000  
 Budget Estimate, 1940..... 79,000

## PROJECT STATEMENT

| Projects                               | 1938     | 1939 (Estimated) | 1940 (Estimated) |
|--|----------|------------------|------------------|
| 1. Preparation of motion pictures....  | \$59,453 | \$59,000         | \$59,000         |
| 2. Distribution of motion pictures.... | 17,433   | 20,000           | 20,000           |
| Unobligated balance.....               | 2,114    | - -              | - -              |
| Total appropriation.....               | 79,000   | 79,000           | 79,000           |

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## WORK UNDER THIS APPROPRIATION

General. -- These funds meet the expenses incident to the maintenance of a laboratory for the production of motion pictures as a means of disseminating information on the results of scientific research of the various bureaus of the Department and to teach improved methods and practices in agriculture, forestry, rural engineering, home economics, and kindred subjects.

1. Preparation of motion pictures. -- Under this project the actual costs of the preparation of motion pictures are provided. In cooperation with the various bureaus of the Department, scenarios and other details are worked out. Trained personnel is provided for making the necessary pictures and for recording sound, development, processing, and other steps essential to the preparation of films. Necessary traveling expenses incident to work in the field and funds for the transportation of equipment also are provided under this project.

2. Distribution of motion pictures. -- Under this project funds are made available for the actual distribution of the completed films. Necessary personnel is provided in Washington, D.C. to maintain records and to book, ship, and inspect films. Notifications of the release of films are prepared and catalogues and other necessary information furnished. Films are loaned to the 8,500 extension workers and to other educational agencies on request.

## (k) AGRICULTURAL EXHIBITS AT FAIRS

|                              |               |
|------------------------------|---------------|
| Appropriation Act, 1939..... | \$85,000      |
| Budget Estimate, 1940.....   | <u>85,000</u> |

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| 1. Preparation of agricultural exhibits to be shown at fairs..... | \$43,701 | \$44,000            | \$44,000            |
| 2. Exhibition of agricultural exhibits at fairs.....              | 41,197   | 41,000              | 41,000              |
| Unobligated balance.....  | 102      | - -                 | - -                 |
| Total appropriation.....  | 85,000   | 85,000              | 85,000              |

## WORK UNDER THIS APPROPRIATION

General.--- This appropriation item affords the means by which the Department provides the public with agricultural information in the form of exhibits, now recognized as an important method of teaching. It also enables the Department, through the maintenance of a trained staff, to





partially coordinate the general exhibits work of its bureaus. The activity is carried on through cooperative agreements with fairs within the United States, the Department furnishing the exhibits and personnel for their management and demonstration, the fairs paying a share of the cost of transporting exhibits, furnishing exhibition space free, paying drayage and labor for unloading and reloading cars at exhibition points, common labor for unpacking, installing, dismantling, and repacking the exhibits, also janitor, watchman, electrical, and such other special services as are necessary to accomplish creditable displays. The appropriation item is used for projects as follows:

1. Preparation of agricultural exhibits to be shown at fairs. -- The work under this project consists of the planning, preparing, and maintenance of agricultural exhibits, involving (a) analysis of subject-matter, by study and consultation with specialists and scientists of the Department, of exhibit proposals; (b) determination of form of presentation and preparation of exhibit designs and building plans; (c) construction and maintenance of exhibits, involving development of mechanical appliances, electrical devices, art work, modeling, and lettering; and (d) investigations of materials, methods, and principles useful in exhibit work.

2. Exhibition of agricultural exhibits at fairs. -- Work under this project consists of negotiating financial and cooperative agreements with fairs, Government departments and bureaus, railroads, associations, organizations, and other agencies for the movement, installing, display, and demonstration of educational exhibits at about sixty exhibits each year, direction and management of such exhibitions, and the warehousing, shipment, return, and care of a large number of educational exhibits.

(1) GREATER TEXAS AND PAN AMERICAN EXPOSITION

(Transfer to Agriculture, Act of April 9, 1937).

A transfer of \$12,000 was made to the Extension Service for participation in the Greater Texas and Pan American Exposition held in Dallas, Texas, during the fiscal years 1937 and 1938. Of this amount \$770 was obligated during fiscal year 1937, and the balance, \$11,230, during the fiscal year 1938.

This transfer was for the purpose of employing personnel, purchasing materials, and the making of contracts necessary in designing, preparing, and assembling educational exhibits portraying activities of the Department of Agriculture; for installing, demonstrating, and maintaining these exhibits at the Greater Texas and Pan American Exposition, Dallas, Texas; and for their return to the custody of the Department and restoration to such condition as will permit their use at subsequent occasions.



## (m) GREAT LAKES EXPOSITION

(Transfer to Agriculture, Act of May 15, 1936)  
 (Continuance of participation in 1937 and 1938,  
 provided for by Pub. Res. No. 23, approved Apr. 12, 1937).

A net amount of \$16,353 was transferred to the Extension Service for participation in the Great Lakes Exposition, Cleveland, Ohio, during the fiscal years 1936, 1937, and 1938. Of this amount, \$6,968 was obligated during the fiscal year 1938, and an unobligated balance of \$76 was transferred back to the Great Lakes Exposition appropriation.

This transfer was for the purpose of employing personnel, purchasing materials, and the making of contracts necessary in designing, assembling, transporting, installing, demonstrating, and arranging for the safekeeping of the Department's exhibits at the Great Lakes Exposition and their return to the custody of the Department.

## (n) INTERNATIONAL EXPOSITION OF PARIS, FRANCE

(Transfer to Agriculture, 1936-1938, as provided by Public Resolution No. 8, approved Feb. 25, 1937).

A transfer of \$2,000 was made to the Extension Service for the purpose of preparing and assembling an exhibit for the Department of Agriculture in connection with its participation in the International Exposition of Paris, France, in the year 1937. Of this amount \$526 was obligated in 1937 and \$1,074 in 1938, and the balance, \$400, was transferred back to the International Exposition of Paris, France, appropriation.

## (o) PAN AMERICAN EXPOSITION, TAMPA, FLORIDA

(Transfer to Agriculture, Act of May 23, 1938).

A transfer of \$448 was made to the Extension Service for the purpose of preparing an exhibit for display at the Pan American Exposition, Tampa, Florida, in the year 1939.

## (p) SEVENTH WORLD'S POULTRY CONGRESS AND EXPOSITION

(Transfer to Agriculture, 1938 - Dec. 31, 1939,  
 in accordance with provisions in the Acts of  
 July 30, 1937 (50 Stat., p. 550), and Aug. 25,  
 1937 (50 Stat., p. 771), and with request con-  
 tained in letter of the Secretary of Agriculture  
 to the Secretary of State, dated Dec. 23, 1937.)

The sum of \$24,843.38 was transferred to the Extension Service for participation in the Seventh World's Poultry Congress and Exposition to be held in Cleveland, Ohio, in 1939. Of this amount \$500 was obligated during the fiscal year 1938, and the balance, \$24,343, is available for obligation during the fiscal years 1939 and 1940, of which amount it is



estimated that \$16,060 will be obligated in fiscal year 1939 and \$8,283 in fiscal year 1940.

This transfer was for the purpose of employing personnel, purchasing materials, making contracts necessary in designing, preparing, assembling, transporting, installing, demonstrating, and arranging for the safekeeping of the Department's exhibits at the Seventh World's Poultry Congress and Exposition and their return to the custody of the Department of Agriculture.

(q) COOPERATIVE FARM FORESTRY EXTENSION WORK

|                              |               |
|------------------------------|---------------|
| Appropriation Act, 1939..... | \$56,838      |
| Budget Estimate, 1940.....   | 100,000       |
| Increase.....                | <u>43,162</u> |

PROJECT STATEMENT

| Projects   | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase   |
|--|---------|---------------------|---------------------|------------|
| 1. Technical advice and assistance in farm forestry to State extension forces..... | \$6,440 | \$6,298             | \$6,940             | + \$642(1) |
| 2. Allotments to States for cooperative farm forestry (Clarke-McNary Act)...       | 50,105  | 50,540              | 93,060              | +42,520(2) |
| Unobligated balance.....   | 293     | -                   | -                   | -          |
| Total appropriation  | 56,838  | 56,838              | 100,000             | +43,162    |

INCREASE

The increase of \$43,162 in this item for 1940 consists of:

(1) An increase of \$642 for technical advice and assistance to State extension forces, to take care of additional travel of supervising foresters necessitated by proposed additional cooperation.

(2) An increase of \$42,520 for allotments to States for cooperative farm forestry under provisions of the Clarke-McNary Act, to be used as follows:

(a) \$16,780 for placing cooperation with 33 States and Puerto Rico on a basis of \$1,980 per annum each. The maximum appropriation previously made under this item was \$74,000 in 1932, which permitted cooperation with the States on the basis of \$1,980 per annum to each State then in position to provide offsetting funds. When this appropriation was curtailed in 1934, it was necessary to reduce State

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allotments to amounts ranging from \$800 to \$1,620 each. Provision for the Department to pay approximately one-half of the salaries and travel expense (i.e., \$1980) of those State extension foresters now employed will permit expansion of forestry extension work through the use of State funds thus released. This expansion would be reflected in cooperation by the States in the employment of additional foresters.

(b) \$25,740 for extension of cooperation on a full-time basis at \$1,980 per annum through the employment of approximately 13 additional farm foresters. Certain States have indicated that they are now in a position to cooperate in the employment of a forester by providing the offset required. In addition, certain States now cooperating are in a position to meet the required offset necessary to employ a second forester. Accordingly, it is planned to enter into cooperation in the employment of approximately 13 additional foresters on the full-time basis of \$1,980 per annum.

#### WORK UNDER THIS APPROPRIATION

General.-- Section 5 of the Clarke-McNary Forestry Act of June 7, 1924, authorizes an annual appropriation of \$100,000 for the promotion of educational work with farm people in establishing, improving, and renewing woodlots, shelterbelts, windbreaks, and other valuable forest growth and in growing and renewing useful timber crops. The present appropriation is \$56,838, and the funds are allotted to the States and Territories by the Secretary of Agriculture on the basis of cooperative agreements for extension activities in farm forestry. This farm forestry extension work is conducted in conjunction with the cooperative agricultural extension program.

1. Technical advice and assistance in farm forestry to State extension forces.-- The allotment for this project covers the cost of the employment of one extension forestry specialist in Washington and travel. His services are essential to the coordination of all extension activities in farm forestry in the field. The extension forester assists State Extension Services to incorporate the practical results of the research findings of the Federal Forest Service in State extension forestry programs and acts as a carrier of forestry extension information from State to State. This specialist also prepares forestry extension literature, makes talks, and radio addresses, and otherwise promotes better forestry practices.

2. Allotments to States for cooperative farm forestry (Clarke-McNary Act).-- The funds for this project cover the cost of cooperation with the States in the employment of extension farm foresters. The usual arrangement is for the Federal Extension Service to contribute toward the salary of the extension forester, the State providing for the remainder of his salary, travel expenses, clerical help, and other necessary expenses. Usually the contribution by a State is considerably more than that of the



Extension Service. At present this cooperative arrangement is in effect with 33 States and Puerto Rico. A very large part of the farm acreage of the United States is in woodland, and much of the income of farmers in certain sections, particularly the Northeastern and Southern States, is from forest products. County agents generally are not trained in forest management and need the assistance of farm forestry specialists in strengthening their work in this field. The extension forester arranges demonstrations in woodlot management, selection of trees for cutting, estimating of merchantable timber, and in other fields. In many States the extension forester is also active in assisting farmers in forest planting plans and in interesting members of boys' and girls' clubs in tree planting.

The allotments to the States and Puerto Rico under the Clarke-McNary Act for the fiscal year 1939 are as follows:

|                    |        |                     |             |
|--------------------|--------|---------------------|-------------|
| Alabama.....       | \$1620 | Nebraska.....       | \$1620      |
| California.....    | 1620   | New Hampshire.....  | 1620        |
| Colorado.....      | 900    | New Jersey.....     | 1620        |
| Connecticut.....   | 1020   | New York.....       | 1620        |
| Georgia.....       | 1620   | North Carolina..... | 1620        |
| Idaho.....         | 1620   | North Dakota.....   | 1260        |
| Illinois.....      | 1620   | Ohio.....           | 1440        |
| Indiana.....       | 1620   | Pennsylvania.....   | 1260        |
| Iowa.....          | 1620   | Tennessee.....      | 1620        |
| Kansas.....        | 1020   | Texas.....          | 1620        |
| Louisiana.....     | 1620   | Utah.....           | 1080        |
| Maryland.....      | 1620   | Vermont.....        | 1620        |
| Massachusetts..... | 1620   | Virginia.....       | 1620        |
| Michigan.....      | 1620   | West Virginia.....  | 1620        |
| Minnesota.....     | 1620   | Wisconsin.....      | 1620        |
| Mississippi.....   | 1620   | Wyoming.....        | 1260        |
| Montana.....       | 800    | Puerto Rico.....    | <u>1620</u> |

Total allotments..... 50,540

(r) IN ALL, SALARIES AND EXPENSES

Change in Language

It is recommended that the language of this paragraph be amended by inserting after the words "In all, salaries and expenses," the following:

"to be accounted for as one fund"

For explanation of this change see general note in these Justifications under Office of Experiment Stations, page 54.

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the research.

2. The second part of the report is a detailed description of the methods used in the study. It includes a discussion of the experimental design, the data collection procedures, and the statistical analysis techniques.

3. The third part of the report is a presentation of the results of the study. It includes a discussion of the findings, a comparison of the results with previous research, and a conclusion about the significance of the study.

4. The fourth part of the report is a discussion of the implications of the study. It includes a discussion of the limitations of the study, the strengths of the study, and the future directions of the research.

The following table shows the results of the study. The table is organized into two columns: the first column shows the results for the first group, and the second column shows the results for the second group.

|  |  |
|--|--|
| 1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the research.  | 1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the research.  |
| 2. The second part of the report is a detailed description of the methods used in the study. It includes a discussion of the experimental design, the data collection procedures, and the statistical analysis techniques.         | 2. The second part of the report is a detailed description of the methods used in the study. It includes a discussion of the experimental design, the data collection procedures, and the statistical analysis techniques.         |
| 3. The third part of the report is a presentation of the results of the study. It includes a discussion of the findings, a comparison of the results with previous research, and a conclusion about the significance of the study. | 3. The third part of the report is a presentation of the results of the study. It includes a discussion of the findings, a comparison of the results with previous research, and a conclusion about the significance of the study. |
| 4. The fourth part of the report is a discussion of the implications of the study. It includes a discussion of the limitations of the study, the strengths of the study, and the future directions of the research.                | 4. The fourth part of the report is a discussion of the implications of the study. It includes a discussion of the limitations of the study, the strengths of the study, and the future directions of the research.                |

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## (s) COOPERATIVE AGRICULTURAL EXTENSION WORK

(Permanent Annual Smith-Lever Appropriation)

Permanent Appropriation, 1939.....\$4,701,165  
 Budget Estimate, 1940.....4,701,165

## PROJECT STATEMENT

| Project   | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-------------|---------------------|---------------------|
| Payments to States, Hawaii, and<br>Puerto Rico for cooperative<br>agricultural extension work<br>(Smith-Lever Act)..... | \$4,701,165 | \$4,701,165         | \$4,701,165         |

## WORK UNDER THIS APPROPRIATION

This is the permanent specific appropriation for cooperative agricultural extension work provided in the Smith-Lever Act, approved May 8, 1914 (7 U.S.C. 341-348), as amended by the extension of this Act to the Territory of Hawaii by the Act of May 16, 1928 (7 U.S.C. 386-386b) and to Puerto Rico by the Act of March 4, 1931 (7 U.S.C. 386d-386f).

Under the provisions of these Acts, \$10,000 is appropriated annually to each State, Hawaii, and Puerto Rico without requirements of State or Territorial offset, and the remainder of the appropriation is distributed on the basis of rural population. This is the basic act under which cooperative extension work is conducted by the Department and the State colleges of agriculture, making available to rural people information on agriculture and home economics. County agricultural agents, home demonstration agents, club workers, and State specialists assist adults and young people in the application of the results of research in agriculture and home economics to meet local conditions and to improve individual farm and home enterprises and rural life generally.

The State allotments are paid directly to a designated officer in each State and are disbursed by the States in accordance with budgets and programs of work submitted by the State directors of extension and approved by the Secretary of Agriculture. Expenditures by the States from this and other cooperative extension appropriations are subject to annual inspection by representatives of the Department.





FOREIGN AGRICULTURAL SERVICE

(Formerly conducted under item "Foreign Competition and Demand," Bureau of Agricultural Economics; recommended in the 1940 Estimates to be set up as a separate unit under (Office of the Secretary).

|   |                |
|---|----------------|
| Appropriation, 1939 ("Foreign Competition and Demand," Bureau of Agricultural Economics)..... | \$295,000      |
| Budget Estimate, 1940.....  | <u>545,000</u> |
| Increase.....   | <u>250,000</u> |

## PROJECT STATEMENT

| Project                          | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase        |
|----------------------------------|-----------|---------------------|---------------------|-----------------|
| Foreign-agricultural service.... | \$296,889 | \$295,000           | \$545,000           | + \$250,000 (1) |
| Unobligated balance.....         | 1,111     | - -                 | - -                 | - -             |
| Total appropriation.....         | 298,000   | 295,000             | 545,000             | + 250,000       |

## INCREASE

(1) An increase of \$250,000 is recommended in this item for 1940 to provide for expansion of the Department's work with respect to the competition and demand for agricultural products in Latin-American countries.

The general purpose of the Department in connection with the proposed expansion of its activities in the Latin-American field is to maintain, broaden, and improve our economic and other relations with these countries. Specifically, the Department's representatives will investigate the possibilities of expanding the markets in Latin America for United States agricultural products; investigate the agricultural resources and potentialities of the Latin-American countries from the standpoint of increased production of noncompetitive agricultural products, particularly those of strategic importance to the United States; and investigate the trends and potentialities of production of competitive agricultural products in Latin America. These representatives will serve as regional directors for the more technical investigations as to the possibilities for increased production of strategic materials needed by the United States and will advise the chiefs of diplomatic missions concerning agricultural developments,

In view of the severe losses sustained by this country in its European markets, notably in Germany, and prospective further losses of markets in the Orient, American agriculture must find new foreign outlets elsewhere or greatly



curtail its total production. Latin America, particularly in the Tropics, offers the only important potential foreign markets for such products as wheat flour and other cereal products, pork and lard, rice, canned, dried, and fresh fruits and vegetables, and dairy products. It is at the same time an important present or potential producer of a number of strategic raw materials, such as rubber, quinine, and other noncompetitive raw materials greatly needed by the United States. Thus, there is a sound basis for reciprocal trade between Latin America and the United States which, if developed, would be directly beneficial to American agriculture and to the national economy. It is desirable, in the long-term interests of both areas, that the productive capacities of these countries be directed toward the production of strategic raw materials which the United States needs and to which their natural resources are better adapted.

It is proposed to survey the tropical hardwood resources of Latin America to determine the availability and accessibility of commercial stands and to obtain samples of selected woods for testing in our laboratories. Our imports of tropical hardwoods exceed 100 million board feet a year, but less than half of these imports originate in Latin America. The proposed studies should result in a greater proportion of tropical hardwoods being imported from Latin America. These imports would not be detrimental to domestic interests because we are now cutting our domestic hardwoods faster than they are growing. Moreover, certain of the cabinet woods of Latin America find no counterpart in the United States and thus our furniture manufacturers will be able to compete successfully with the manufacturers of other countries. The survey and tests are essential to determine the utility of available South American hardwoods regarding which very little is known.

It is proposed to survey the Latin-American countries and obtain information concerning soils, vegetation, climatic factors, and disease conditions, particularly as they pertain to the cultivation of rubber, quinine, and other valuable tropical plants needed by the United States. Through these surveys it is hoped to locate the areas where cultivation of these plants might be successful and to discover disease-resistant strains which might be used in the commercial production of rubber. By encouraging the cultivation of these products we would not only protect our source of supply in times of national emergency but would also aid in establishing better trade relations with our Latin-American neighbors. Specifically, it is proposed that the survey consist of five separate parties, made up of qualified horticulturists and pathologists, who would explore the appropriate areas.

#### CHANGES IN LANGUAGE

It is recommended that the language of the item "Foreign competition and demand," under the Bureau of Agricultural Economics, be adapted to the "Foreign Agricultural Service", with amendments, so that the revised paragraph will read as follows:

[Foreign competition and demand:] To enable the Secretary of Agriculture to carry into effect the provisions of the Act entitled "An Act to promote the agriculture of the United States by expanding in the foreign field the service now rendered by the United States Department of Agriculture in



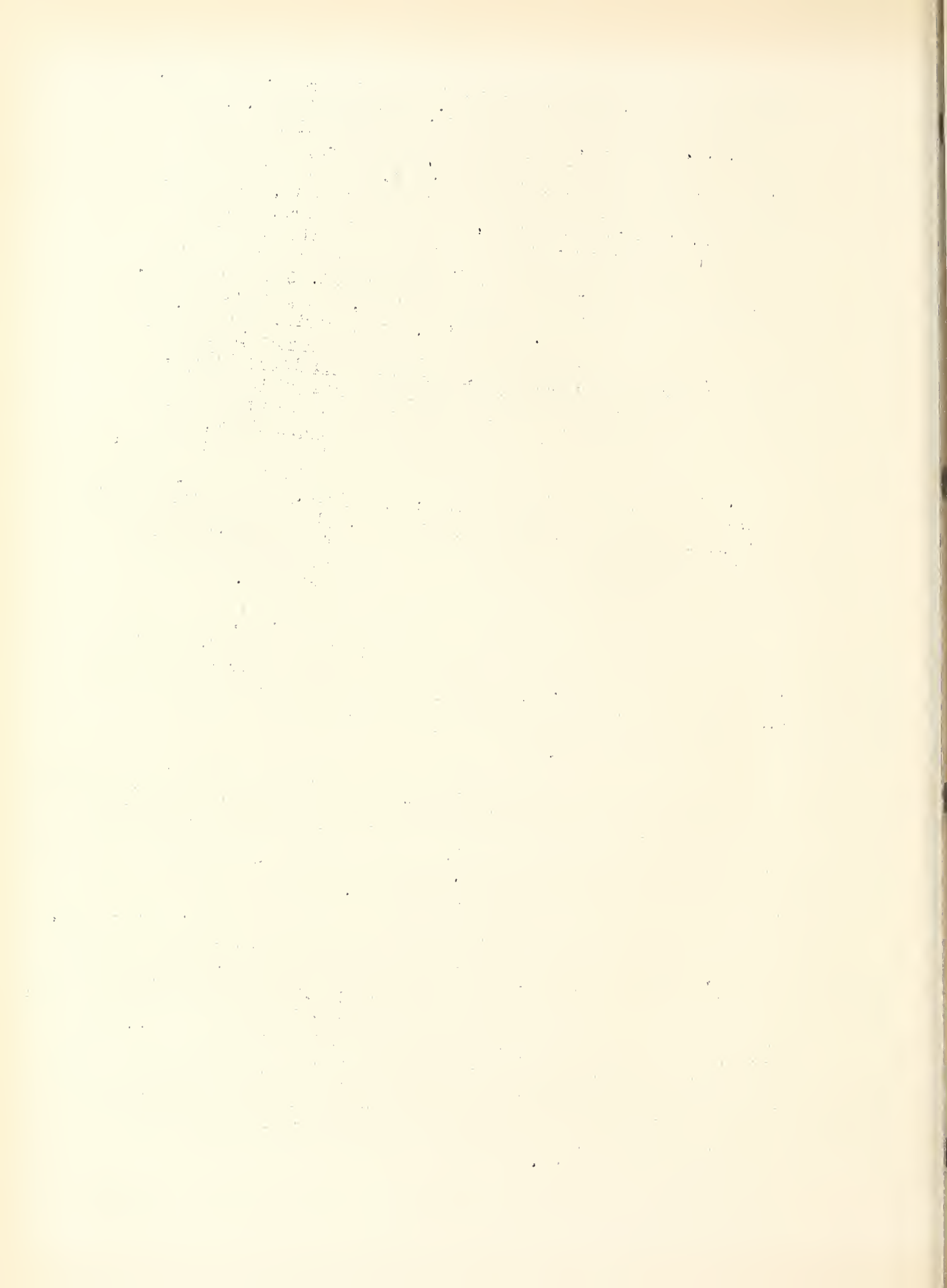


acquiring and diffusing useful information regarding agriculture, and for other purposes", approved June 5, 1930 (7 U.S.C. 541-545), and for collecting and disseminating to American producers, importers, exporters, and other interested persons information relative to the world supply of and need for American agricultural products, marketing methods, conditions, prices, and other factors, a knowledge of which is necessary to the advantageous disposition of such products in foreign countries, independently and in cooperation with other branches of the Government, State agencies, purchasing and consuming organizations, and persons engaged in the transportation, marketing, and distribution of farm and food products, including biologic and economic investigations of rubber, forestry, medicinal and insecticidal, and other agricultural plants and products of the Latin-American countries, and including the employment of persons and means in the District of Columbia and elsewhere, and the purchase of such books and periodicals and not to exceed \$1,000 for newspapers as may be necessary in connection with this work, [ \$295,000] \$545,000: Provided, That the Secretary of Agriculture may, in his discretion, allot or transfer funds from this appropriation to any agency of the Department of Agriculture to enable such agency to render assistance in carrying out the purposes of this appropriation.

The purpose of the first change in this paragraph, that is, the insertion of the clause "including biologic and economic investigations of rubber, forestry, medicinal and insecticidal, and other agricultural plants and products of the Latin-American countries, and" is to broaden the scope of the item and to specifically authorize work in Latin America, as contemplated by the increased appropriation recommended for 1940.

The second change adds the words "the employment of persons and means in the District of Columbia and elsewhere." Since the Foreign Agricultural Service is being established as a separate agency of the Department, it will be necessary to incorporate the language authorizing the employment of persons and means in the District of Columbia and elsewhere. This authority conforms to that carried under other bureaus and services of the Department.

The third change provides "That the Secretary of Agriculture may, in his discretion, allot or transfer funds from this appropriation to any agency of the Department of Agriculture to enable such agency to render assistance in carrying out the purposes of this appropriation." Since the foreign agricultural work of the Department is being centralized as an independent unit in the Office of the Secretary, this authority will enable the Secretary to make project assignments to and secure the cooperation of any agency of the Department in studying outlets for agricultural products in the Latin-American countries and the possibilities of increased trade between these countries and the United States, and will authorize the transfer of funds to cover the costs of such cooperation.





## WORK UNDER THIS APPROPRIATION

The activities of the Foreign Agricultural Service embraces work on reciprocal trade agreements and allied work; general research in foreign agricultural production, trade, and government policies; special commodity investigations; technical foreign market investigations; and current information and service activities.

This Service keeps in constant touch with the changing agricultural situation in the principal foreign countries through its own representatives and through cooperation with other Government agencies, the International Institute of Agriculture, and departments of foreign Governments. It also publishes information on foreign agricultural conditions for the benefit of American producers and others.

In the work on reciprocal trade agreements the Foreign Agricultural Service provides from its professional staff representatives of the Department of Agriculture on the numerous interdepartmental committees which have been established under the trade agreements program. These representatives, on the basis of careful analysis of the pertinent statistics and other information on agricultural production, consumption, and trade, assist in the preparation of the schedules in the individual trade agreements relating to concessions to be secured by the United States and to be granted by this country on agricultural products. They suggest concessions that will be beneficial from the standpoint of our exports, as well as provide basic information in regard to the industries likely to be affected by duty reductions by the United States on agricultural products. They also follow the actual operation of trade agreements from the standpoint of their effect on agricultural exports and imports.

The principal work during the past year concerned the trade agreements recently concluded with the United Kingdom and with Canada. A trade agreement with Czechoslovakia was completed during the year, and work is now being done in connection with the possibility of negotiating agreements with several additional countries.

Basic research and investigations are constantly carried on in respect to trends in foreign agricultural production, international trade in agricultural products, and foreign governmental policies relating to agriculture. Outstanding examples of studies in this field in the year were the reports on British Empire preferences in relation to American agricultural exports and a supplementary report on the effect of the preferential treatment of Empire tobacco; on the Argentine corn situation; and on the consumption of cotton in the Orient.

Field offices of the Service are now maintained in London, Paris, Berlin, Belgrade, Buenos Aires, and Shanghai. Several commodity specialists are employed to make special investigations covering particular products in the foreign field.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is essential for the proper management of the organization's finances and for ensuring transparency in all dealings.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes how this information is used to identify trends, assess risks, and make informed decisions about the future of the organization.

3. The third part of the document focuses on the implementation of these findings. It details the steps taken to put the recommendations into practice and the challenges encountered along the way. It also discusses the ongoing nature of this process and the need for continuous improvement.

4. The fourth part of the document provides a summary of the key findings and conclusions. It highlights the most significant results of the study and offers suggestions for further research and action. It concludes by reiterating the commitment to excellence and the pursuit of the organization's mission.

## SUPPLEMENTAL FUNDS

Direct Allotment

| Project  | Estimated<br>obligations,<br>1940 | Estimated<br>obligations,<br>1939 | Obligated,<br>1938 |
|--|-----------------------------------|-----------------------------------|--------------------|
| <u>Agricultural Adjustment Administra-</u><br><u>tion (Salaries and Expenses):</u><br>Services in connection with Agri-<br>cultural Adjustment programs..... | \$25,000                          | \$25,000                          | \$24,992           |

STATE OF NEW YORK

IN SENATE

January 1, 1900

REPORT

OF THE

COMMISSIONERS

OF THE LAND OFFICE

WEATHER BUREAU

## (a) SALARIES AND EXPENSES

Changes in Language

The language of the general introductory paragraph to "Salaries and Expenses" has been amended as follows:

The words "the amendment thereof contained in section 5(e) of the Air Commerce Act of 1926 (15 U.S.C. 313)" have been eliminated and the words "section 803 of the Civil Aeronautics Act of 1938 (52 Stat. 1014)" have been inserted in lieu thereof.

This change in the statutory references in the preamble is required to give effect to provisions contained in the Civil Aeronautics Act of 1938. The provisions of the Air Commerce Act of 1926, so far as they relate to the Weather Bureau (44 Stat. 571-Sec. 5-e) are repealed by Sec. 1107 (k) of the Civil Aeronautics Act of 1938.

## (b) GENERAL ADMINISTRATIVE EXPENSES

Appropriation Act, 1939 . . . . . \$145,000  
Budget Estimate, 1940. . . . . 145,000

## PROJECT STATEMENT

| Project   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| General administration and<br>business service..... | \$169,098 | \$145,000           | \$145,000           |
| Unobligated balance.....                            | 902       | --                  | --                  |
| Total appropriation.....                            | 170,000   | 145,000             | 145,000             |

## WORK UNDER THIS APPROPRIATION

General administration of the Bureau is centralized in Washington, D. C. and this appropriation provides for the maintenance of fiscal and administrative units, including offices concerned with matters of personnel, accounting, contracts, files, and property.





## (c) GENERAL WEATHER SERVICE AND RESEARCH

|                                  |                  |
|----------------------------------|------------------|
| Appropriation Act, 1939. . . . . | \$2,342,870      |
| Budget Estimate, 1940. . . . .   | <u>2,496,570</u> |
| Increase . . . . .               | <u>153,700</u>   |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase     |
|---|-----------|---------------------|---------------------|--------------|
| <b>A. General Weather Service</b>                   |           |                     |                     |              |
| 1. General forecast and warning service.....        | \$938,530 | \$940,000           | \$1,093,700         | \$153,700(1) |
| 2. Climatological service.....                      | 689,823   | 691,000             | 691,000             | --           |
| 3. Hurricane and storm-warning service.....         | 103,539   | 105,000             | 105,000             | --           |
| 4. River and flood service....                      | 178,225   | 179,500             | 179,500             | --           |
| 5. Forest fire-weather service.                     | 61,263    | 62,300              | 62,300              | --           |
| 6. Agricultural meteorological service.....         | 115,045   | 116,000             | 116,000             | --           |
| 7. Marine meteorological service.....               | 112,589   | 115,000             | 115,000             | --           |
| 8. Horticultural protection service.....            | 38,922    | 39,000              | 39,000              | --           |
| Total, General Weather Service.....                 | 2,237,936 | 2,247,800           | 2,401,500           | \$153,700    |
| <b>B. General Weather Research</b>                  |           |                     |                     |              |
| 9. Meteorological physics.....                      | 14,405    | 14,500              | 14,500              | --           |
| 10. Forecast improvement investigations.....        | 29,682    | 29,800              | 29,800              | --           |
| 11. Hurricane investigations...                     | 4,025     | 4,100               | 4,100               | --           |
| 12. River and flood investigations.....             | 14,833    | 15,000              | 15,000              | --           |
| 13. Forest fire-weather investigations.....         | 3,890     | 3,930               | 3,930               | --           |
| 14. Agricultural meteorological investigations..... | 4,705     | 4,800               | 4,800               | --           |
| 15. Climatological investigations.....              | 5,495     | 5,600               | 5,600               | --           |
| 16. Marine meteorological investigations.....       | 7,422     | 5,600               | 5,600               | --           |
| 17. Horticultural protection investigations.....    | 11,602    | 11,740              | 11,740              | --           |
| Total, General Weather Research.....                | 96,059    | 95,070              | 95,070              | --           |
| Total obligations.....                              | 2,333,995 | 2,342,870           | 2,496,570           | \$153,700    |
| Unobligated balance.....                            | 8,875     | --                  | --                  | --           |
| Total appropriation.....                            | 2,342,870 | 2,342,870           | 2,496,570           | \$153,700    |

[illegible][illegible]

1. The first part of the document is a list of names and addresses, which are arranged in a columnar format. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and addresses, and the second section containing names and addresses.

2. The second part of the document is a list of names and addresses, which are arranged in a columnar format. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and addresses, and the second section containing names and addresses.

3. The third part of the document is a list of names and addresses, which are arranged in a columnar format. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and addresses, and the second section containing names and addresses.

4. The fourth part of the document is a list of names and addresses, which are arranged in a columnar format. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and addresses, and the second section containing names and addresses.

5. The fifth part of the document is a list of names and addresses, which are arranged in a columnar format. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and addresses, and the second section containing names and addresses.

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## INCREASES

(1) The increase of \$153,700 in this item for 1940 submitted under the project for general forecast and warning service consists of:

(a) \$100,000 to provide for four maps and forecasts daily. This increase is to provide agricultural, commercial, and transportation (land and water) interests, and the public generally, with more adequate weather service, demands for which have been insistent and increasing. The Weather Bureau has endeavored to meet these demands for increased service as far as possible with existing facilities, but attempts in this direction have fallen far short of requirements due to lack of sufficient personnel and appropriate facilities. As a result, the Weather Bureau has frequently been placed in an embarrassing position.

Agricultural, commercial, and transportation interests are entitled to and should be given adequate service. These interests, as well as the general public, are now served by only two forecasts daily, based on observations taken at 7:30 a.m. and 7:30 p.m. Furthermore, such forecasts reach the public too late to be of maximum benefit. The increase requested will make it possible to issue an earlier forecast which will be available at the start of the business day and also to provide an additional forecast at mid-afternoon. Often weather changes are not indicated on the morning chart but are made evident by observations taken six hours later. These changes may and frequently do seriously affect the public and business. The Weather Bureau should be in position to give prompt and adequate advance information of these occurrences. This can be done only by completely charting all data obtained by four daily observations and by issuing forecasts and warnings based thereon. These forecasts, supplemented by the observations secured by teletype in city offices, will provide the service that is required.

Under existing conditions none of the 6 district forecast centers of the Weather Bureau can provide 24-hour service. One forecaster as a rule does all the forecast work each month, thereby necessitating that he be on duty twice daily, in the morning and again at night, every day in the month, Sundays and holidays included. A qualified forecaster, together with sufficient personnel, should be on duty at each of these centers all the time to chart the data and to disseminate the forecasts and information. With the funds under consideration in this item it will be practicable to issue four complete forecasts a day from 2 of the centers and partial service from 2 more.

Similarly, personnel and facilities should be available for continuous service at the offices located in the larger cities. Weather is no respecter of hours. Storms, cold-waves, floods, and the like are not confined to commercial hours. They come on Sundays and holidays, on Saturday afternoons, after office hours, and at night. But it is not practicable with the means now at hand to provide service at these times--a service which would be of high value to newspapers, railroads, bus and street railway companies, shippers of perishable products, florists, operators of garages, heating plants, etc., and which not only would result in the saving of millions of dollars worth of property and goods but would contribute much to public comfort, convenience, and pleasure. It is planned to give such service from as many city offices as possible.

1. The first group of people who are not in the labor force are those who are not in the labor force because they are not in the labor force.

1. 1. 1.

4

..



At present business men have to depend largely on the forecasts and weather information based on the 7:30 a.m., E. S. T. observations. They cannot be made available until late in the forenoon and until those observations are collected, charted, forecasts deducted therefrom, and the bulletins or maps containing individual reports from all parts of the country are printed and distributed. Industries should have these things at the beginning of the business day instead of nearly the middle of it. Utilization of the 1:30 a. m., E. S. T., observations will make this possible.

(b) \$53,700 for teletype installations in city offices. Under this estimate it is planned to place these machines in offices located in about 23 large cities and to connect them with the teletype lines of the Civil Aeronautics Authority over which flow weather observations taken on scheduled hours at regular stations and hourly at about 800 places located on and contiguous to airways. These observations are now available at airports located in or near the same cities and will give these city offices the benefit of comprehensive weather information night and day for all parts of the country and at a minimum cost. The information will be utilized in the preparation of local forecasts and in responding to numerous telephone calls for weather information, which at most stations normally amount to several hundred daily and sometimes run into thousands when severe weather is prevailing or expected. Under present conditions this service could not be performed at airport stations without interference with airway service. The service proposed under this estimate is in accord with the recommendation made by the Civil Aeronautics Authority. In addition to providing for better service to the general business interests of the commercial centers at a relatively small cost, such installations would improve the airways weather service by relieving airport offices of calls for general weather information which are seriously interfering with the operations of the airport offices.

#### WORK UNDER THIS APPROPRIATION

General.--This appropriation provides for the conduct of all service activities of the Weather Bureau necessary for the maintenance of nationwide meteorological activities serving agriculture, commerce, and many other special interests, as well as the general public. The work consists of the collection and dissemination of meteorological data and the issuance and distribution of weather forecasts, warnings, and advices, as well as the basic research essential thereto. The advisory and warning services, including those in connection with the occurrence of storms, hurricanes, cold waves, frosts, fire-weather conditions, and floods, are fundamental purposes set forth in the organic act creating the Weather Bureau.

#### A. General Weather Service

1. General Forecast and Warning Service.--The preparation and dissemination of weather forecasts and warnings constitute a fundamental activity of the Bureau, and for this purpose Congress originally authorized a Federal weather service in 1870. Under this project the Bureau is required to take, record, encipher, telegraph, and compile regular meteorological observations; to issue general and local weather forecasts daily, and frost, cold-wave, and other special warnings and forecasts whenever injurious weather and temperature conditions are expected; and to disseminate weather forecasts, warnings,





and synopses by telephone and telegraph, by printed bulletins, maps, and forecast cards, and through cooperation with the newspapers, radio broadcasting stations, and other available means, for the benefit of agriculture, commerce, and navigation in all parts of the United States and in adjacent ocean areas. Synoptic weather observations are collected by telegraph, radio, telephone, and teletype and are immediately charted. Skilled and experienced forecasters who have a thorough knowledge of the physical processes involved are able to determine therefrom the weather changes that will ensue. The forecasts and warnings so prepared are promptly and widely disseminated.

2. Climatological Service.--This service was established by an Act of Congress (15 U.S.C. 311-313, 317), effective July 1, 1891, which charged the Weather Bureau with collecting meteorological data sufficient to establish the climatological characteristics of the United States. The work covers the collection and publication of climatological data for all parts of the United States, including the preparation of maps to show normal climatic conditions in different sections of the country. It involves the maintenance of 5,000 cooperative and other meteorological stations, for which daily, monthly, and annual reports of temperature, precipitation, etc., are compiled and published. Forty-two separate monthly and annual reports are published, and data for the entire country are issued annually in the United States Meteorological Yearbook. Summarizations appear in Bulletin W for all past years of record.

3. Hurricane and Storm-Warning Service.--Issuance of storm warnings for the Great Lakes was authorized by Congress in 1870. The service has since been extended to the Atlantic, Pacific, and Gulf coasts, and the use of radio on shipboard has resulted in extension of the service to ships at sea. The Weather Bureau must locate and follow storms, including those of tropical origin (hurricanes) by means of synoptic observations assembled on weather charts; furnish information as to the location, intensity, and movement of storms; and issue warnings of their approach (including prediction of dangerous winds and tides which sometimes attend them) for the benefit of mariners and residents of seacoast and lakeshore sections. Observations are collected by radio and cable from West Indian stations and by radio from ships at sea to supplement the regular collection for general forecast purposes. Advices and warnings are disseminated by telegraph, telephone, and radio, including displays by means of flags and lanterns at nearly 300 storm-warning display stations located at ports along the coasts of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Great Lakes. During the hurricane season from June 16 to November 15, inclusive, the Weather Bureau operates a teletype system connecting its offices on the coast of Florida and the Gulf of Mexico by which observations are exchanged between stations and warnings instantly communicated from forecast centers to threatened localities.

4. River and Flood Service.--This service was inaugurated in 1870 with the installation of a few river and rain gages. The organization now consists of 67 river forecasting centers through which approximately 700 river stations, 300 rainfall stations, 84 snowfall stations, and 60 evaporation stations are administered, the whole being under the administrative control of the River and Flood Division. The primary object of the service is the issuance of river stage and flood forecasts for the saving of life and property and for the benefit of agriculture, navigation, and flood control. The service is particularly



essential in organizing flood disaster relief and in planning organized evacuation of flooded areas. The flood forecasting service is known to be the means of saving annually millions of dollars worth of property and as planned for the future can be expected to reduce materially the average annual loss which is now approximately \$100,000,000. The river stage forecasts made from day to day are of vital importance to navigation interests, to the operation of river control works, and to construction work in progress along rivers. Snowfall depths and density measurements have been made at 84 snowfall stations. Twenty of the snowfall stations have been equipped with batteries of storage snow gages. Evaporation losses have been measured at about 60 evaporation stations throughout the country.

5. Forest Fire-Weather Service.--Fire-weather warnings were first issued in 1916 as a regular service from district forecast centers. In succeeding years several independent fire-weather districts were organized with specialists assigned to the work. Seven separate districts are now maintained. In the conduct of this work meteorological data from fire-weather substations in forested areas are collected and compiled to ascertain the influence of current weather conditions on the frequency and spread of fires. Daily observations obtained by telegraph, telephone, and radio from these substations are utilized in the preparation of special forecasts and warnings, which are issued to Federal, State, and private agencies engaged in the protection of forests from fires. Acting upon the forecasts and warnings, forestry officials augment, deploy, or concentrate their fire-fighting forces in accordance with the indicated weather and hazard conditions. In western districts this program is supplemented by an intensive service designed to aid in controlling individual fires. Truck units, equipped with two-way radio, meteorological, and compact office facilities, are dispatched on call to the scene of large going forest fires, where they become an integral part of the fire-fighting organization. They are essentially portable meteorological offices at which detailed weather reports are collected by radio and from which the forecaster in charge issues timely predictions of vital importance to officers in charge of fire control in formulating suppression tactics.

6. Agricultural Meteorological Service.--In 1872 the Signal Service of the War Department published the first weather bulletin in the country, containing a summary of weather as affecting agriculture. This was finally developed into what are now known as "Corn and Wheat and Cotton Region Bulletins" and "Weekly Weather and Crop Bulletins", which are published at Washington and certain field stations. This project provides for the collection and publication of data relating to current weather conditions and their effect on crop growth and agricultural operations in general. Publication of the data and determination of their effect on crop growth and farm work are based largely on reports from numerous weather observers and weather and crop correspondents in all sections of the United States and on known relations of weather to crops established by investigations and research in the field of agricultural meteorology.

7. Marine Meteorological Service.--Service work on ocean meteorology has been conducted by the Government for almost a century. The Navy and (successively) the Army and the Weather Bureau have maintained individually or cooperatively the continuity of this activity since 1844. The Weather Bureau is now specifically designated by law (5 U.S.C., 458a) to conduct the major lines of work in ocean meteorology and to furnish meteorological information published on the Pilot Charts and in Sailing Directions and Naval Air Pilot





Books issued by the Hydrographic Office of the Navy. The primary objects of the project are the maintenance and improvement of ocean weather observations and reports through an extensive program organized for rapidly collecting, charting, and summarizing the reports to provide maritime commerce with accurate, properly digested meteorological information and at the same time to secure data for basic studies of weather conditions and storms affecting the continental United States and the adjacent oceans. Daily weather observations at sea are taken and reported in prescribed form by ships' officers using (in the main) meteorological instruments that are regularly a part of a ship's instrumental equipment. Contacts with the observing officers and supervision of the meteorological instruments are largely accomplished through 30 field offices of the Weather Bureau located at major ports of the United States and its island possessions.

8. Horticultural Protection Service.--With the advent of a systematic practice of protecting orchards and truck gardens from frost, specialized local forecasts, as an aid in protecting operations, became necessary. The special Horticultural Protection Service of the Weather Bureau began in 1917. The work consists of specialized local forecasts for the use of fruit and truck growers in their frost-protection work; also advice as to best methods of protection. The forecasts are made from synoptic weather charts and current local observations, including hygrometric formulae applicable to the particular locality.

#### B. General Weather Research

9. Meteorological Physics.--A knowledge of the physical processes that occur in the atmosphere is basic to an efficient meteorological service. Studies along this line have been made in the past with important results, but they are even more necessary and valuable now in view of the more abundant and more accurate data available on land, at sea, and in the air and the increasing use of the knowledge of physical processes in all practical applications of meteorology. The object of the work is to advance our knowledge of physical conditions and processes in the atmosphere that produce weather phenomena, including the distribution and effects of solar radiant energy, and to adapt the results of theoretical investigations to the needs of the practical work of the Bureau. One or more technical problems are under specific investigation at all times. The current literature on technical subjects relating to meteorology is read and digested in order to keep fully informed of every new development. Continual contact is maintained with others conducting scientific research in related fields.

10. Forecast Improvement Investigations.--Studies for the purpose of improving the accuracy and extending the period of weather forecasts have been carried on currently since the establishment of the Weather Bureau. Such studies have resulted in a better understanding of the physical problems involved and in improved service to the public. The work covers investigations of the causes of weather changes in an endeavor to ascertain the physical basis of the changes, including the genesis of fronts and disturbances; the formation of rules and principles for the guidance of the forecaster; and the development of means for extending the period of the forecasts to cover a month or season. Investigations are carried on at the





six district forecast centers where the forecasters alternate monthly between active duty and study. Similar researches are conducted at other field stations. Intensive studies of frontal, kinematic, and thermodynamic analyses of surface and upper-air synoptic charts, including isentropic charts and flow patterns, and of air masses, are prosecuted at the central office in Washington. Files of daily weather maps and the meteorological records, both surface and upper-air, of past months, seasons, and years form the basis of statistical and other investigations.

11. Hurricane Investigations.---Investigations of hurricanes by the Weather Bureau date back nearly half a century. Development and utilization of the knowledge of hurricane characteristics and movements were stimulated by the invention and growth of radio communication in the first quarter of the present century. As a result, much additional information is now available as a basis for the investigations. Fully developed hurricanes are attended by winds dangerous to ships at sea and destructive to life and property in coastal sections. Some are accompanied by inundations which cause great loss of life and property. All available observations from ships at sea and island and coastal stations, including detailed reports secured by mail, are charted for study of each hurricane. The studies concern the movement of hurricanes in relation to kind, amount, and movement of clouds; wind directions and speed at the surface and from pilot balloon observations of the upper air; direction, period, and amplitude of sea swells which precede the hurricane; tides along the coast in advance of the storm center; and the general pressure distribution. In order to secure data regarding the vertical structure of hurricanes instruments attached to sounding balloons will be sent up from stations located in Puerto Rico, Cuba, and the southern portion of the United States during the passage of these disturbances. Investigations are also being conducted in cooperation with the University of Florida and the University of Puerto Rico to determine the possibility of locating hurricane centers by static emanations.

12. River and Flood Investigations.---This work consists of studies of the relation of precipitation to both ordinary flow and flood flow in streams. River-stage forecasting procedure is supplemented by hydrologic methods of estimating stream-flow from rainfall and other related factors. For this purpose the country has been divided into 10 hydrologic regions. Cooperation is maintained with the Geological Survey and the Commonwealth of Pennsylvania, the purpose of which is to develop an improved forecasting service on the streams of that State. Studies of snowmelt-runoff relationships are being conducted on three experimental watersheds established in Yellowstone Park. Studies of storm rainfall and related hydrologic factors are being conducted in a section of the River and Flood Division for the purpose of providing data essential to the design of spillways and waterways. Evaporation investigations are being conducted cooperatively with the University of Iowa.

13. Forest Fire-Weather Investigations.---The Weather Bureau assists directly in lessening the staggering economic loss caused by forest fires through operation of its fire-weather forecasting service. In order that this service may function most efficiently and effectively, an investigative program is conducted to determine the exact relationship between meteorological conditions and the inception and spread of forest fires, and to improve



the forecasts issued. Investigations of this character were instituted in 1924. Studies conducted under this project are aimed in part at a more adequate conception of the complex effects of weather conditions upon fire hazard, and the variations of significant weather elements over areas of varied topography. Such information is essential since it forms the basis for other studies specifically designed to improve the accuracy and comprehensiveness of forecasts furnished protection agencies. Daily observations are compiled by decades, months and seasons; and the extremes and averages of conditions are correlated with fire occurrences. Of particular importance in this program are intensive studies of weather conditions in relation to the occurrence of lightning storms, which are directly responsible for a large number of fires.

14. Agricultural Meteorological Investigations.--For many years there have been more or less systematically conducted investigations of the effect of weather on crops. Results of the first extensive investigations of the Weather Bureau in this field are contained in Weather Bureau Bulletin No. 36, "Relations Between Climates and Crops", by Cleveland Abbe, in 1905. Since then considerable investigational work has been done and the results published. Investigations are made to determine the relation between weather and crops, especially optimum weather conditions for different crops, as an aid, among other things, in determining the areas best suited, from the climatic standpoint, for various crops. Up to the present time the work has been carried on principally through mathematical correlations of temperature, sunshine, precipitation, relative humidity, and other weather elements with crop yields.

15. Climatological Investigations.--When sufficient meteorological records became available, for some stations as early as 1870, investigations were begun to determine the climatic characteristics of different sections of the United States, and work of this character has continued up to the present time, becoming more dependable as the length of the records increased. Also from time to time various climatic charts have been prepared and revised as additional data became available. Studies are made to determine the climatic features of the United States and, incidentally, in a meager way, of foreign countries. Climate is a determining factor in economic land use, and for best results in agriculture, in general, and for specific use of land for certain crops, it is necessary to have dependable information as to the normal climate and variations therefrom. Summarizing, studying, charting, and comparing weather records of different sections for long periods of time and the preparation of normal charts for different climatic elements showing geographic distribution of comparable conditions are conducted under this project; also special studies, such as climatic trends, drought frequency, etc., for different areas.

16. Marine Meteorological Investigations.--The study of winds and storms at sea constituted one of the earliest phases of meteorological research because of the extreme importance of ocean weather to transport by sail, and this interest on the part of navigators has continued to the present time. Work under this project involves the analysis of data from accumulated records for application to meteorological problems. The importance of such analyses to determine atmospheric conditions over the oceans is accentuated by the development of air navigation. Research in marine meteorology has



the following objectives: (1) Continual revision and improvement of the data required by law to be furnished by the Weather Bureau for publications by the Hydrographic Office of the Navy Department for benefit of maritime commerce; (2) extraction of data from the accumulated records for application to modern problems of ocean transport, including air navigation, air-conditioning and refrigerating of ships, and determination of climatic influences on cargoes moving on routes that encounter a wide variety of weather conditions within the term of a single passage; and (3) investigation into possible relations between the temperature of the ocean surface and the weather conditions on the continents to obtain data useful for application to problems of extension in the range of weather forecasts. Research is being advanced by the development of punch-card methods of statistical analysis, by application of mathematical correlation methods, and by steady increase in properly digested summaries of ocean weather data for study.

17. Horticultural Protection Investigations.---For specialized local frost forecasting for the protection of fruit and vegetables, basic data applicable to the specific localities were necessary, and investigational work to obtain these began in 1917. Various forecasting formulae, etc., have been improved from time to time as longer records became available. Studies are made to determine the relative susceptibility to frost of different localities having varying topographic features, and meteorological data are collected for the preparation of hygrometric formulae as an aid in local forecasting. Investigations are also conducted as to the most effective and economical methods of protecting fruit and vegetable crops from frost damage. Establishment and maintenance of a large number of meteorological stations representing different topographic and other conditions is required to determine temperature and humidity relations in different localities.







(a) AIRWAYS WEATHER SERVICE AND RESEARCH  
(Formerly "Aerology")

Appropriation Act, 1939. . . . . \$2,500,000  
Budget Estimate 1940. . . . . 4,105,000  
Increase. . . . . 1,605,000

## PROJECT STATEMENT

| Projects  | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase        |
|---|-------------|---------------------|---------------------|-----------------|
| <b>A. Airways Weather Service:</b>                |             |                     |                     |                 |
| 1. Commercial airway meteorological service....   | \$1,690,180 | \$2,025,721         | \$3,396,626         | +\$1,370,905(1) |
| 2. Upper-air soundings.....                       | 413,389     | (a)426,900          | 660,995             | + 234,095(2)    |
| Total, Airways weather service.....               | 2,103,569   | (a)2,452,621        | 4,057,621           | + 1,605,000     |
| <b>B. Airways Weather Research:</b>               |             |                     |                     |                 |
| 3. Commercial airway forecast investigations....  | 11,185      | 11,338              | 11,338              | --              |
| 4. Upper-air surveys and investigations.....      | 35,910      | 36,041              | 36,041              | --              |
| Total, Airways weather research.....              | 47,095      | 47,379              | 47,379              |                 |
| Total obligations.....                            | 2,150,664   | (a)2,500,000        | 4,105,000           | + 1,605,000     |
| Transferred to "Commerce, Bureau of Standards"... | 3,000       | --                  | --                  | --              |
| Unobligated balance.....                          | 36,515      | --                  | --                  | --              |
| Total appropriation.....                          | 2,190,179   | (a)2,500,000        | 4,105,000           | + 1,605,000     |

(a) Includes \$2,920 transferred to "Rent of Buildings in the District of Columbia", Office of the Secretary.

## INCREASES

The increase of \$1,605,000 in this item for 1940 consists of:

(1) An increase of \$1,370,905 for Commercial Airway Meteorological Service, including:

(A) \$819,762 to establish meteorological service at important airway terminals, provide service on new airways, reorganize the service at certain airway stations, and intensify the off-airway network. The Administrator of the Civil Aeronautics Authority urgently recommends that meteorological service in aid of aviation in the United States be brought up to a standard adequate to make effective the system of airway traffic control and airway aids now maintained by the Authority with consequent enhancement of the safety of life and property over the airways. To accomplish this, he specifically recommends:

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(a) That airport stations, on a 24-hour basis, manned by Weather Bureau commissioned personnel be established at 50 airway terminals to provide continuous weather observation service, prepare weather maps, take upper-air wind observations, and give meteorological advice to pilots, dispatchers, and air transport companies. The Weather Bureau has no personnel at any of these points. Further, all of these are or will become important communication centers of the Civil Aeronautics Authority, where the taking of meteorological observations by radio personnel interferes seriously with air traffic control, the guarding of aircraft frequencies, and vital communication duties.

(b) That complete complements of commissioned Weather Bureau personnel be assigned to 10 important terminals on the teletype circuits, where the operation of the teletype and the taking of weather observations for aircraft are now performed by untrained and inexperienced local observers. The Weather Bureau now has one commissioned man in charge at each of these points but increased flying activities now require the same type of service as contemplated under the above paragraph. Experience of the past two years shows conclusively that continued employment of local observers at these places is unsafe and inefficient, resulting in many cases of inaccurate and incomplete observations. Air transport companies, airmen, and meteorologists are unable to depend upon weather reports from such personnel for dispatching passenger-carrying airplanes.

(c) That two new airway forecast and general supervising stations, vitally necessary to safety on two trans-continental routes (Albuquerque, N. Mex. and Billings, Mont.), be established; and that the service at the present 11 airway forecast and general supervising stations be strengthened.

(d) That adequate meteorological service be provided on recently established airways and the service reorganized over existing airways by equipment with teletype and radio. Under the appropriation requested, the Weather Bureau would provide service for eight newly established airways for which funds have previously not been received and provide equipment and other necessary service in connection with the establishment of teletype over four other airways. The eight new airways which are specifically named in the Civil Aeronautics Act of 1938, are as follows;

Memphis-Tampa  
Jacksonville-New Orleans  
Detroit-Sault Ste. Marie  
Wichita-Pueblo  
Bismarck-Las Vegas  
Phoenix-Las Vegas  
San Antonio-Houston  
Houston-Brownsville

The four existing airways to be equipped with teletype are:

Omaha-Bismarck  
El Paso-Cheyenne  
Huron-Minneapolis  
Tulsa-Kansas City

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(e) That twenty-seven new stations be established off the airways for making 3-hourly weather observations from areas where such reports are not now available. There are now large areas in the present reporting network from which reports are not received due to the lack of suitable reporting stations, with the consequence that many weather situations arise which are unknown to the forecasters, pilots, and dispatchers prior to their actual encroachment upon heavily-traveled airways. It is expected that two of the new stations will be located at high elevations for special service in checking the passage of upper-air fronts, determining aircraft icing conditions, reporting tops of clouds and the pressure at the 5000-foot level, and many other phenomena of vital importance to the preparation of accurate weather advices for the benefit of air transportation.

The stations and airport terminals which it is now expected will be involved in this program are as follows:

Alabama

Dothan (d)  
Double Springs (d)  
Florence (d)  
Montgomery (a) (d)  
Troy (d)

Arizona

Chloride (d)  
Kingman (a)  
Matthie (d)  
Packard (e)  
Prescott (d)  
Tucson (a)

California

Bakersfield (a)  
Burbank (c)  
Fresno (a)  
Long Beach (b)  
Modesto (a)  
Oakland (c)

Colorado

Greeley (d)  
Colorado Springs (d)  
La Junta (d)  
Lamar (d)  
Larkspur (d)  
Pikes Peak (e)  
Walsenburg (d)

Connecticut

New Haven (b)

Florida

Blountstown (d)  
Cross City (d)  
Dunnellon (d)  
Live Oak (d)  
Melbourne (a)  
Parry (d)  
Pensacola (d)  
Tallahassee (a) (d)  
Trenton (e)  
Valparaiso (d)

Georgia

Augusta (a)  
Atlanta (c)  
Metter (e)  
Macon (a)  
Savannah (a)

Idaho

Boise (a)

Illinois

Benton (e)  
Chicago (c)

Indiana

Ft. Wayne (a)  
Goshen (a)  
Terre Haute (a)

Iowa

Iowa City (b)  
Sioux City (a) (d)

Kansas

Coffeyville (d)  
Dodge City (a) (d)  
Garden City (d)  
Hutchison (d)  
Seneca (e)  
Syracuse (d)

Louisiana

Lake Charles (a)  
Port Eads (e)  
Shreveport (a)

Maine

Bangor (a)  
Caribou (a)  
Portland (a)

Michigan

Charlevoix (d)  
Flint (d)  
Detroit (Wayne County) (a)  
Gladwin (d)  
Houghton Lake (d)  
Muskegon (b)  
Saginaw (d)  
St. Ignace (d)  
Traverse City (d)

Minnesota

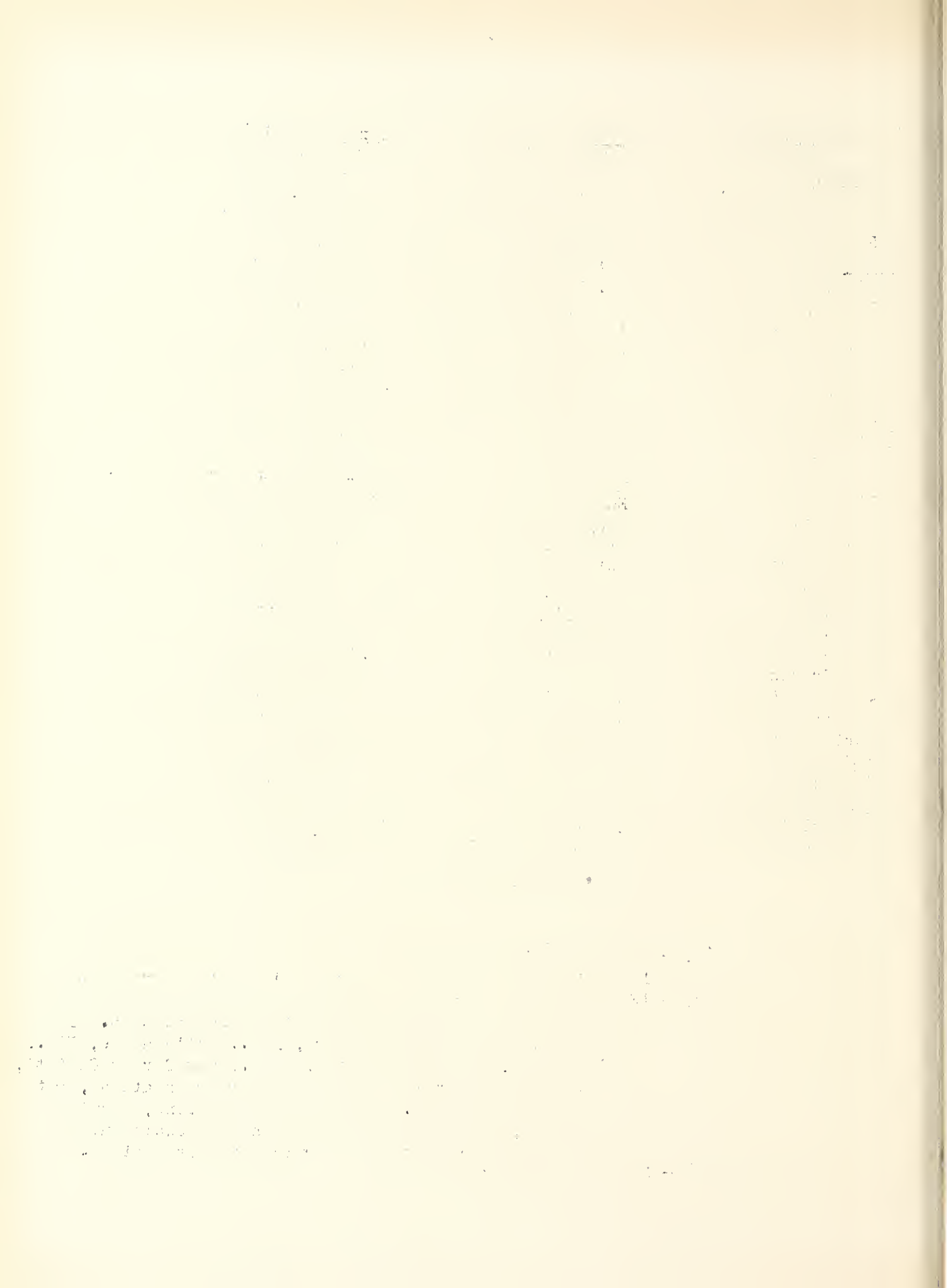
Brainerd (e)  
International Falls (e)  
Roseau (e)  
Willmar (d)





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| <u>Mississippi</u>    | <u>North Dakota</u>   | <u>Texas (cont'd)</u> |
| Corinth (d)           | Ashley (d)            | Fort Worth (c)        |
| <u>Missouri</u>       | Minot (d)             | Gonzales (d)          |
| Kansas City (c)       | Pembina (a)           | Guthrie (e)           |
| Louisiana (e)         | Underwood (d)         | Kingsville (e)        |
| Springfield (a)       | <u>New York</u>       | Rankin (e)            |
| <u>Montana</u>        | Delhi (e)             | Raymondville (d)      |
| Billings (c)          | Mt. Whiteface (e)     | Sonora (e)            |
| Broadus (e)           | Rochester (b)         | Victoria (d)          |
| Great Falls (a)       | Watertown (e)         | Waco (a)              |
| Helena (a)            | <u>Ohio</u>           | Sharton (d)           |
| Jordan (e)            | Adelphia (e)          | Wichita Falls (a)     |
| Miles City (a)        | Cleveland (c)         | <u>Utah</u>           |
| Missoula (a)          | Dayton (Vandalis) (a) | Blanding (e)          |
| <u>Nebraska</u>       | <u>Oklahoma</u>       | Salt Lake City (c)    |
| Center (e)            | Guymon (e)            | <u>Vermont</u>        |
| Grand Island (b)      | <u>Oregon</u>         | Brattleboro (e)       |
| Lincoln (b)           | Eugene (b)            | <u>Virginia</u>       |
| North Platte (a)      | <u>Pennsylvania</u>   | Arlington (c)         |
| <u>Nevada</u>         | Allentown (a)         | Norfolk (a)           |
| Boulder City (d)      | Erie (a)              | Roanoke (a)           |
| Elko (a)              | Mercer (a)            | <u>Washington</u>     |
| <u>New Mexico</u>     | <u>Rhode Island</u>   | Ellensburg (a)        |
| Albuquerque (c)       | Providence (b)        | Seattle (c)           |
| Engle (d)             | <u>South Dakota</u>   | <u>West Virginia</u>  |
| Las Cruces (d)        | Aberdeen (d)          | Charleston (a)        |
| Santa Fe (d)          | Mitchell (d)          | Fairmont (e)          |
| Socorro (d)           | Watertown (d)         | Parkersburg (a)       |
| Springer (d)          | <u>Tennessee</u>      | <u>Wisconsin</u>      |
| <u>New Jersey</u>     | Chattanooga (a)       | La Crosse (a)         |
| Newark (c)            | <u>Texas</u>          | Madison (b)           |
| <u>North Carolina</u> | Amarillo (a)          | Montello (e)          |
| Hayesville (e)        | Austin (a)            | <u>Wyoming</u>        |
| Raleigh (a)           | Big Springs (a)       | Casper (a)            |
|                       | Columbus (d)          | Sheridan (a)          |
|                       | Corpus Christi (d)    |                       |

- (a) - 50 Airport Stations
- (b) - 10 Replacement local observers at important terminals
- (c) - 13 Forecast Centers
- (d) - 56 Stations on new or recently established airways. Five of these stations (Montgomery, Ala., Tallahassee, Fla., Sioux City, Iowa, Dodge City, Kans., and Corpus Christi, Tex.) will be new large terminal airport stations, with full-time personnel. The other 51 stations, now in operation, will be provided with needed equipment to expand and improve the service at these points.
- (e) - 27 Off-Airway Stations



(B) \$223,208 to provide an adequate meteorological service in aid of air navigation in Alaska. The Administrator of the Civil Aeronautics Authority recommends that an adequate meteorological service for air navigation in Alaska be established, particularly for scheduled flying on the route from Seattle, Washington, to Nome, Alaska, via Ketchikan, Juneau, Cordova, Anchorage, and Fairbanks. Following, as it does over a great part of its length, a route which lies between high mountains and the ocean, this airway is subject to intensely adverse flying weather. A strong meteorological service, involving the collection of frequent surface observations from a well-distributed network of stations; the taking of radiometeorograph soundings once each day at Anchorage, Fairbanks, Juneau, and Ketchikan; reports of upper-air winds four times each day from an adequate network of stations; the preparation of weather maps and charts four times daily at the principal terminals, and the issuance of six-hourly airway forecasts, are absolutely essential and must be provided if air transport is to operate with a reasonable degree of safety and efficiency.

As a part of this program, it is proposed to establish airway forecast centers at Juneau, Anchorage, and Fairbanks; to establish first-order stations with upper-air wind observations at Bethel, Cordova, and Ketchikan; and to establish a network of 33 second-order stations reporting at six-hourly or more frequent intervals, such reports to be used for clearance of aircraft and the preparation of weather maps and airway forecasts.

(C) \$327,935 for transoceanic flying service. The object of this increase is to materially expand the present meteorological service rendered by ships at sea, as an aid in transoceanic flying operations. Expansion and development of the existing program to make it adaptable and efficient for the necessities of air service over seas and oceans is urgent. Basically this service is predicated on the securing of weather observations from surface ships. This has been done for many years in connection with the securing of information required in forecasting for general purposes and in the issuing of forecasts and warnings for the benefit of shipping. The present service is far from adequate from the standpoint of commercial necessities, national defense, or of safe and successful flying operations in general.

It is well understood that the successful development of transoceanic flying operations is absolutely dependent upon a thoroughly organized and efficient weather reporting service. Surface vessels can get along to a degree with the present service, as they have been compelled to do; large ships can push their way against gales and buffeting seas; but airplanes and airships cannot cope with such conditions. Business men cannot be expected to invest capital in expensive air clippers, nor will people trust their lives in such craft, unless they are assured of a highly efficient weather service before a journey is started and while in the air.

An international responsibility is involved in this service. No single country or company can provide the weather service needed. Canada and the United States are expected to furnish service for the western portion of the Atlantic; while other nations must be depended upon to take care of areas to the eastward. Canada already has gone far in meeting its responsibilities by establishing radio stations for the specific purpose at Botwood





and Louisburg; England and Ireland have done the same at Foynes (Ireland); and France has stationed a ship between the Azores and Bermuda for the purpose of collecting weather reports from other ships and broadcasting them for the benefit of all. Great Britain, France, and Germany now supply ship observations four times daily, and Canada is doing the same for areas along the northern ship lanes. None of these countries are nearly so far behind as the United States.

The inadequacy of our Weather Bureau transoceanic service has already resulted in embarrassing situations. During the past summer, for example, several crossings were made for which the Weather Bureau could give only slight service. Other flights of experimental and epoch-making character are scheduled preliminary to regular service which will begin next year.

A conference was held in Ireland early in 1938 for discussion of what is needed for a trans-Atlantic flying service. Representatives of the Weather Bureau and the Bureau of Air Commerce attended this conference. This estimate conforms to the report made by them and also complies with the request made by the Administrator of the Civil Aeronautics Authority in his letter of September 26, 1938, relative to estimates for additional meteorological service required for aeronautical service. Following is an extract from that letter:

"Increase the number of weather observations, including upper-air reports, from ship stations at sea, increasing the number of observations from two to four daily, also increase the number of ship stations and utilize expanded coding as much as may be necessary".

(2) An increase of \$234,095 in the project Upper-Air Soundings, to provide for radiometeorograph and upper-air wind observations from regions where these are now lacking. The present network of soundings of upper-air temperature, humidity, pressure, etc., obtained by means of airplanes and radiometeorographs is wholly inadequate for use in analyzing weather developments, with the consequence that the accuracy of airway forecasts and other information necessary for proper conduct of air transport operations is seriously open to question. This situation is intensified by the fact that six airplane observation stations, hitherto maintained by the Army, were discontinued on June 30, 1938, leaving large gaps in the already inadequate network. Recognizing this situation and its importance to air navigation safety, the administrator of the Civil Aeronautics Authority recommends that funds be obtained for radiometeorograph stations, 6 to replace those discontinued by the Army and 7 to bring the network of such stations somewhere near to effectiveness. (The radiometeorograph has now been developed to a state of reliability and, since it makes possible the obtaining of upper-air data to much greater heights than the airplane can possibly reach, and does this without any personnel hazard, it is planned to utilize the radiometeorograph exclusively hereafter for upper-air soundings.) There are also large regions to either side of major airways and along the coasts from which reports of upper-air winds which are vitally necessary for the adequate analysis of weather conditions, the safe and efficient operation of aircraft under traffic control regulations, and the determination of the velocities of movement of adverse weather areas, are not now available. To meet in part the need for such data from these regions, the Administrator of the Civil Aeronautics Authority recommends that upper-air wind observations be inaugurated at 7 existing Weather Bureau first-order stations off the airways, such observations to be taken four times each day.

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Stations where it is expected these observations will be inaugurated, if additional funds are granted, are as follows:

| <u>Pilot balloon<br/>observations</u> | <u>Radiometeorograph<br/>observations</u> |
|---------------------------------------|---|
| Eastport, Me.                         | Albuquerque, N. Mex.                      |
| Nantucket, Mass.                      | Phoenix, Ariz.                            |
| Alpena, Mich.                         | Miami, Fla.                               |
| Marquette, Mich.                      | Atlanta, Ga.                              |
| Duluth, Minn.                         | Boise, Idaho                              |
| Roswell, N. Mex.                      | Minneapolis, Minn.                        |
| Green Bay, Wis.                       | St. Louis, Mo.                            |
|                                       | Buffalo, N. Y.                            |
|                                       | Medford, Oreg.                            |
|                                       | Charleston, S. C.                         |
|                                       | San Antonio, Tex.                         |
|                                       | Seattle, Wash.                            |
|                                       | San Juan, P.R.                            |

#### CHANGES IN LANGUAGE

The title of this appropriation has been amended by substituting for the word "Aerology" the words "Airways weather service and research". There has also been inserted in the text of the paragraph, after the word "For", the words "promoting the safety and efficiency of aircraft as provided by Section 803 of the Civil Aeronautics Act of 1938 and for".

The change in designation of the subappropriation is to provide a more descriptive and understandable title. The second change is to give effect to the provisions of Sec. 803 of the Civil Aeronautics Act of 1938 relating to the Weather Bureau.

#### WORK UNDER THIS APPROPRIATION

General.--In accordance with the Civil Aeronautics Act of 1938, meteorological service and forecasts are provided for the protection of aviation on civil airways upon recommendation of the Civil Aeronautics Authority. In addition, upper-air soundings and investigations are conducted under this appropriation in aid of air navigation and in connection with general weather forecasting.

##### A. Airways Weather Service

1. Commercial Airway Meteorological Service.--Intensive weather service for air navigation was inaugurated by the Weather Bureau soon after passage of the Air Commerce Act in May, 1926. At the close of 1926 the transcontinental airway was the only one on which flights were being made both day and night. Since that time the airway weather service has expanded with the increased number of Federal airways. In 1938 there were approximately 23,000 miles of airways over which 24-hour weather service was maintained and approximately 12,000 miles over which service was maintained on a less than 24-hour basis. The airway weather service is maintained to provide the maximum amount of safety possible in air navigation so far as weather is concerned.

Specific and accurate weather information is essential in air travel, particularly as regards ceiling heights and visibility. The airways weather service consists primarily of hourly reports from stations on the airways and 6-hourly reports from off-airway stations, the latter category being composed of about 160 stations, thus providing a dense network of reports over the country as a whole. These reports are collected at 11 designated centers where they



are charted and aviation forecasts prepared. These forecasts are promptly distributed over the airways network, chiefly by means of teletype and radio, with special advices at 3-hourly intervals whenever important weather changes justify.

2. Upper-Air Soundings.—Observations in the upper-air were begun in 1898 by the use of kites and captive balloons. Airplane observations began to displace kites and captive balloons in 1931 and wholly supplanted them in 1933.

In July, 1934, the Weather Bureau operated 6 airplane observation stations by contracting with commercial flyers, and the War and Navy Departments made airplane observations at approximately an equal number of stations each. Beginning in the first half of the fiscal year 1939, the Weather Bureau will have under contract 6 airplane observation stations. The Navy Department will make observations at 8 stations, including Pearl Harbor, Hawaii, Coco Solo, Canal Zone, and St. Thomas, Virgin Islands. Airplane observations were discontinued by the War Department on June 30, 1938. The Dominion of Canada will make airplane observations at Toronto, Edmonton, and Botwood. All these observations will be available for use at forecast centers and other points in the United States.

Radiometeorograph sounding-balloon observations are proving superior to airplane observations and will probably supplant the latter entirely in a few years. Radiometeorograph observations will be made during the fiscal year 1939 at 6 Weather Bureau stations, 2 Army stations, and 1 or more Navy stations. These observations reach an average height of 75,000 feet. Airplane observations are made daily to heights of 16,500 feet, and free-air temperatures, pressures, and humidities are obtained. Pilot-balloon observations are made 4 times daily, and free-air wind directions and velocities at various elevations are obtained. These data are furnished to local flying interests and promptly transmitted to the various forecast centers. The computed records are forwarded to the central office of the Weather Bureau at Washington, where they are summarized and used in special studies and investigations. Monthly free-air temperatures, pressures, and relative humidities for each station, and monthly free-air wind resultants for a selected number of key stations, are published regularly in the "Monthly Weather Review".

Pilot-balloon observations were inaugurated by the Weather Bureau in 1918, with the number of stations gradually increasing to 79 in 1938. Airplane and pilot-balloon observations are essential in both general and airway forecasting and in identifying air masses.

#### B. Airways Weather Research

3. Commercial Airway Forecast Investigations.—With the accumulation of observational data obtained since the inauguration of intensive airway weather service subsequent to the passage of the Air Commerce Act of 1926, studies have been made with a particular view to determining average flying weather conditions along the airways. Such studies are valuable in laying out new airports and airways and for determining regular flight schedules. Investigations under this project are conducted at the central office at Washington, D. C., and at stations where qualified personnel and the necessary data are available.

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4. Upper-Air Surveys and Investigations.--Numerous aerological surveys have been made to determine average temperatures, pressures, humidities, densities, winds, etc., at various elevations for different sections of the country, as well as special studies and investigations of upper-air conditions. Upper-air observations are classified and correlated with surface conditions in order to determine significant relationships which may be useful in forecasting or to aid in a better understanding of the mechanics of the atmosphere. All observational data are forwarded to the central office of the Weather Bureau in Washington where they are summarized and classified. The data are then used for making special studies and investigations leading to the improvement of general and airway forecasting, both as regards accuracy and length of time covered; to determine meteorological conditions favorable for the formation of ice on aircraft; to effect improvements in methods of pressure reductions to sea level and to the 5000-foot plane; and to increase our knowledge of the mechanics of the atmosphere.

#### CHANGE IN LANGUAGE

Under paragraph "Total, Weather Bureau"

It is recommended that the language of this paragraph be amended by substituting for the word "Total" the following:

"In all, salaries and expenses, to be accounted for as one fund"

For explanation of this change see general note in these Justifications under Office of Experiment Stations, page 54 .

#### SUPPLEMENTAL FUNDS

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Special Research Fund, Department of Agriculture, Weather Bureau:</u><br>For special research projects.....  | \$36,050                    | \$35,100                    | \$29,152        |
| <u>Working Fund, Agriculture, Weather Bureau (War, Flood Control, General):</u><br>For meteorological data on flood control projects.....   | --                          | 48,223                      | 12,537          |
| <u>Working Fund, Agriculture, Maintenance and Improvement of Existing River and Harbor Works (Weather Bureau):</u><br>For furnishing special rainfall reports to the District Engineer, Rock Island, Ill..... | --                          | 904                         | 1,696           |
| Total, Supplemental Funds.....  | 36,050                      | 84,227                      | 43,385          |



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*Journal of Management Education*

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BUILDING, WEATHER BUREAU, WASHINGTON, D. C.

|                              |                      |
|------------------------------|----------------------|
| Appropriation Act, 1939..... | - -                  |
| Budget Estimate, 1940.....   | <u>\$250,000 (a)</u> |
| Increase.....                | <u>250,000</u>       |

- (a) This estimate is carried in the "General Public Works Program" section of the 1940 Federal Budget, page 135.

The appropriation of \$250,000 recommended under this head will provide funds for the construction of the first unit of a new building for the Weather Bureau on the site owned by the Federal Government at 24th and M Streets, Northwest, Washington, D. C.

The proposed structure is urgently needed to relieve overcrowding in the present Weather Bureau building resulting from normal expansion of the work of the Bureau and from the necessity for providing for new functions, particularly meteorological service for commercial aviation. No provision has been made for additional space for the Bureau for more than forty years.

The Weather Bureau at present occupies the two-story and basement brick structure which was purchased by the Government in 1888, and also a two-story brick annex building, the major portion of which was erected at that time, to house the administrative offices and other service units of the organization. The main structure was erected as a residence several years earlier and was not, of course, planned to provide space suitable for office purposes.

All possible alterations of the present structures to provide additional space have been effected. Nothing more in this respect can be accomplished, and the manner in which the personnel, records, and equipment are now housed is subversive of efficient operation, is unsanitary, and constitutes a distinct fire hazard. Space is now leased for office and storage purposes for the Weather Bureau in three buildings in the District of Columbia at an annual rental of approximately \$6,000 and an additional cost for upkeep of approximately \$3,000.

The proposed structure will be a building of fireproof construction, with reinforced concrete frame and floors and exterior walls of tapestry brick with stone or terra cotta trim. It will contain five stories and basement. The first unit will provide approximately 20,000 square feet of usable space and will include an observatory on the roof.

Proposed plans contemplate the construction of the new building in three units, the first of which will be erected on what is now lawn space in front of the present main building. Upon completion of this unit, the personnel housed in rented quarters and some of those now in the old building will be moved to the new unit. When this shift has been effected, a portion



of the old structure will be demolished, thus making possible the erection of unit No. 2 and subsequently unit No. 3 without serious interruption to the functions and work of the Bureau. Permanent headquarters for the Weather Bureau will thus be provided at the same location where weather records have been continuously maintained for the past fifty years.

It is estimated that the proposed structure in its entirety will cost approximately \$815,000 exclusive of necessary equipment, and will provide approximately 75,000 square feet of office and laboratory space.



BUREAU OF ANIMAL INDUSTRY

## (a) SALARIES AND EXPENSES - PREAMBLE

Changes in Language

An addition to the code citations in the preamble has been made so as to include the Act of June 29, 1938 (52 Stat. 1235-1236), amending the Meat Inspection Act of March 4, 1907, as amended and extended, with respect to its application to farmers, retail butchers, and retail dealers. Reference to the Packers and Stockyards Act has been bracketed, since this activity is estimated for 1940 under the Agricultural Marketing Service.

## (b) GENERAL ADMINISTRATIVE EXPENSES

|   |                |
|---|----------------|
| Appropriation Act, 1939 .....   | \$178,220      |
| Allotment for transfer in 1940  |                |
| Estimates to "General Administrative Expenses", Agricultural Marketing Service (incident to transfer of item "Packers and Stockyards Act")..... | - 8,100        |
| Total available, 1939 .....   | 170,120        |
| Budget Estimate, 1940 .....   | <u>170,120</u> |

## PROJECT STATEMENT

| Projects  | 1938       | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|------------|---------------------|---------------------|
| General administration and business service ..... | \$168,465  | \$170,120           | \$170,120           |
| Unobligated balance .....                         | 1,655      | - - -               | - - -               |
| Total.....  | (a)170,120 | (a) 170,120         | 170,120             |

(a) Amounts for 1938 and 1939 exclude allotment of \$8,100 as set forth in first table above (transferred in Estimates for 1940).

## WORK UNDER THIS APPROPRIATION

This appropriation is used for activities concerned with the general direction of the research service and regulatory work of the Bureau including the expenses of the Chief of Bureau's office, accounting, personnel, property, library, editorial activities, etc.





## (c) ANIMAL HUSBANDRY

|                               |                |
|-------------------------------|----------------|
| Appropriation Act, 1939 ..... | \$789,380      |
| Budget Estimate, 1940 .....   | <u>812,880</u> |
| Increase .....                | <u>23,500</u>  |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase    |
|---|-----------|---------------------|---------------------|-------------|
| 1. Swine husbandry investigations.....                            | \$127,122 | \$132,622           | \$132,622           | - - -       |
| 2. Sheep and goat husbandry investigations.....                   | 144,786   | 145,386             | 148,886             | \$3,500 (1) |
| 3. Horse and mule husbandry investigations.....                   | 41,434    | 41,934              | 51,934              | 10,000 (2)  |
| 4. Beef cattle husbandry investigations.....                      | 162,661   | 163,361             | 163,361             | - - -       |
| 5. Dual-purpose cattle husbandry investigations.....              | 60,759    | 61,259              | 66,259              | 5,000 (3)   |
| 6. Poultry husbandry investigations.....                          | 233,457   | 238,957             | 243,957             | 5,000 (4)   |
| 7. Certification of pedigrees of imported livestock.....          | 5,661     | 5,861               | 5,861               | - - -       |
| Transfer to "Diseases of Animals", Bureau of Animal Industry..... | 5,000     | - - -               | - - -               | - - -       |
| Unobligated balance .....   | 8,500     | - - -               | - - -               | - - -       |
| Total .....   | 789,380   | 789,380             | 812,880             | 23,500      |

## INCREASES

The increase of \$23,500 in this item for 1940 consists of:

(1) An increase of \$3,500 for the construction of a cottage needed in connection with sheep breeding investigations. The cottage near the Bureau's barn at Middlebury, Vermont, is in such a state of deterioration that it would be uneconomical to repair it. It is unfit and even dangerous for occupancy. For the protection of the Bureau's valuable experimental breeding flocks, which will include all the Southdown and Southdale sheep now in the possession of the Bureau, and for efficiency in the conduct of the sheep breeding investigations at Middlebury, it is essential to have the shepherd living near the sheep barn.

(2) An increase of \$10,000 for horse and mule husbandry investigations including:

(a) An increase of \$5,000 to provide for investigations dealing with periodic ophthalmia. The disease periodic ophthalmia is one of the important unsolved problems among horses at the present time, and work from a disease angle is now being conducted under the item "Diseases of Animals." Despite the emphasis placed upon this disease by various investigators, the possi-



bility of inheritance and nutrition as direct or indirect causative factors is being overlooked. The sum of \$5,000 is needed to work on this phase of the project, at Middlebury, Vermont, where there are already available stables and pastures and a limited number of Department-owned animals for use in the investigation.

(b) \$5,000 for expansion of horse breeding work under range conditions. The cross-breeding investigations with horses being conducted at Miles City, Montana, are an important part of the breeding work designed to develop a more suitable light horse for the range country. At the present time there is considerable variability in type and performance among the available riding stock in the West which reflects unfavorably upon the efficiency of enterprises in which horses are used, such as handling livestock, trail riding, and pleasure purposes. In order to develop better horses for these uses, long-time breeding effort and the raising of large numbers of animals are required. There is urgent need for additional funds for feed and labor required to maintain the young stock through the necessary performance tests required in this research program.

(3) An increase of \$5,000 for expanding dual-purpose cattle husbandry investigations in the Southeast. This additional amount is necessary to provide for expenses incident to the natural increase in the cattle herd at Brooksville, Florida, where an important cross-breeding investigation with Red Polled, Red Danish, and Devon cattle is under way. The project gives promise of yielding results of great value to the cattle men in the southeastern area through the development of improved strains of higher efficiency. While funds now available are sufficient for the initial stages of the project, by 1940 it is anticipated that there will be 80 breeding cows and at least 30 head of steers. To feed, care for, and test this number of animals will require the additional \$5,000 requested.

(4) An increase of \$5,000 to provide for more adequate administration of the National Poultry Improvement Plan. The National Poultry Improvement Plan has been developed with a view toward establishing the poultry breeding industry upon as sound a basis as possible. The adoption of the plan in all parts of the United States should ultimately accomplish two things: (1) make poultry production more efficient thereby making poultry raising more profitable; and (2) bring about an improvement in the quality of hatching eggs, baby chicks, breeding stock, and market products.

The primary purposes of the plan are (1) to improve the production and breeding qualities of poultry, (2) to reduce losses from pullorum disease, and (3) to identify, authoritatively, poultry breeding stock, hatching eggs, and chicks with respect to quality by describing them in terms uniformly accepted in all parts of the country. Individuals participating in the program, after proper inspection of their flocks, are permitted to use an emblem and designs which indicate the particular breeding stage and pullorum-control class that their poultry and products come within. Protection is hereby afforded producers from unscrupulous competition and purchasers are able to buy with confidence.



The acceptance of the plan is optional on the part of the poultry industry of each State. It is administered in each State by an agency which cooperates with the Department and which represents breeders and hatcherymen and one or more State institutions, such as the State agricultural colleges, agricultural experiment stations, livestock sanitary boards, and departments of agriculture. It is estimated that during the fiscal year 1938 there were expenditures totaling \$402,000 made by the agencies and individuals for co-operation in the plan.

During the fiscal year 1938 there were 2,062 persons in 42 States who were actively engaged in selecting breeding stock and testing it for pullorum disease in conformity with the provisions of the plan. Cooperation now has been started in 2 additional States, making a total of 44 States in which the plan is in operation. As the plan becomes better known the number of breeders and hatcherymen participating increases and at the present time the rate of growth is unusually rapid and the demands for Federal assistance are so great that it is impossible to meet them adequately. This increase of \$5,000 will provide for part of the salary of a poultry geneticist, for necessary additional travel of Federal officials administering the plan, and for supplies and materials.

#### WORK UNDER THIS APPROPRIATION

General.---The animal husbandry investigations deal with the collection and dissemination of information on livestock problems of regional and national importance having to do with the breeding, feeding, and management of domestic farm animals, including poultry. Results are measured in terms of quantity and quality of the animals and their products, such as meat, eggs, wool, mohair, and farm power. These experiments often are conducted in cooperation with other bureaus and divisions of the Department, with one or a group of State agricultural experiment stations, with farmers, and with other agencies.

1. Swine Husbandry Investigations.---This work includes studies to identify and develop strains of swine and to develop methods of feeding and management that will make possible the production of pork economically and profitably; also studies on conformation and yields, proportion of meat to bone, composition, tenderness, flavor, juiciness, and other characteristics of pork and pork products as influenced by variations in production factors and in processing and preparation, including slaughtering, chilling, cutting, curing, rendering of lard, storing, canning and cooking. Swine normally represent about 10 percent of the value of all agricultural production in this country. The results already achieved have been highly valuable, but many problems remain to be worked out and new problems are constantly arising which call for solution.

2. Sheep and Goat Husbandry Investigations.---This work deals with the factors affecting the production of lamb meat, wool, goats' milk, and mohair. Experiments in the breeding and development of types most suitable for production and studies in the methods of management and feeding are made with sheep and goats and the results tabulated and interpreted for other workers





and for the industry. The experimental animals are of known ancestry for many generations back. Data are kept on them from birth to slaughtered carcass, including such factors as productivity, rate of growth, earliness of maturity, and quality of production. Many of the new principles which have resulted from these studies in the past have been made use of by the sheep and wool and mohair industries.

3. Horse and Mule Husbandry Investigations.--This project consists of studies in the breeding, feeding, management, cost of production and maintenance, and utilization of horses and mules, including work with both light and draft breeds of horses and physiological studies in the rearing of orphan foals. Information on stallion enrollment in the various States having stallion enrollment laws is compiled and distributed. A nationwide shortage of work stock and increased interest in the breeding of horse and mule replacements create a demand for information looking toward improved breeding stock.

4. Beef Cattle Husbandry Investigations.--This work consists chiefly of research in problems affecting breeding, feeding, and management of beef cattle and the quality of their meat. It includes studies in range live-stock production, in feeding and fattening various classes of beef cattle under both farm and range conditions, beef cattle record-of-performance studies, breeding studies to develop crossbred cattle which will be especially adaptable to certain sections of the United States having unfavorable climate, and the development of strains within the established beef breeds that will have superior germ plasm for efficiency and quality of production. Pasture management and grazing studies, mineral deficiency problems affecting range cattle production, and special vitamin and other nutritive requirements also are dealt with.

5. Dual-Purpose Cattle Husbandry Investigations.--This work consists chiefly of research in problems relating to breeding. It includes studies in the development of true breeding strains of Milking Shorthorn and Red Polled cattle for high fertility, desirable conformation, and comparatively high production of both beef and milk; studies of the performance of the offspring to determine the relative values of germ plasm of different strains; meat studies to determine the quality of the meat; and studies of the nutritive requirements of dual-purpose cattle for growth and production.

6. Poultry Husbandry Investigations.--The work under this project consists chiefly of research in breeding, feeding, hatchability, and flock management. The breeding studies are conducted for the purpose of enabling producers to develop, through selection and breeding, more efficient egg and meat producing strains and to improve the quality of eggs, breeding stock, and poultry meat. Studies in poultry nutrition are carried on in order to develop efficient diets for all classes of poultry and to develop methods for the most efficient utilization of feed in order to promote the most economical production of eggs and poultry meat of superior quality. Other lines of research embrace a study of fundamental principles involved in various physiological practices associated with the production of poultry and poultry products and studies on the most efficient methods of incubation.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$ . It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

2. In the second part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

3. In the third part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

4. In the fourth part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

5. In the fifth part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

6. In the sixth part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

7. In the seventh part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

8. In the eighth part of the paper the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  is solved. It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if the function  $f(x)$  is continuous and has a bounded derivative.

The Department is now cooperating with agencies in 44 States in putting into effect the regulations of the National Poultry Improvement Plan which are designed to improve the quality of hatching eggs, baby chicks, and breeding stock produced by those participating in the plan. The agency in each State is composed of representatives of breeders and hatcherymen and one or more State institutions. Over 6,000,000 farmers raise poultry, and there are several thousand commercial poultry producers. There are over 400,000,000 laying hens kept in the United States annually and the average egg production is approximately 90, whereas improved methods of feeding and proper selection could readily increase this to 150, and further improved methods to an average of 170. Approximately 800,000,000 chicks are raised in the United States annually, most of them in commercial hatcheries, of which there are approximately 12,000.

7. Certification of Pedigrees of Imported Livestock. -- This work is regulatory in character and consists of the certification of purebred animals imported into the United States under the provisions of paragraph 1606 of the Tariff Act of 1930. It comprises the examination of pedigrees of the animals imported and certification to the Collector of Customs at the port for entry free of duty.

(d) DISEASES OF ANIMALS

|                               |                |
|-------------------------------|----------------|
| Appropriation Act, 1939 ..... | \$447,000      |
| Budget Estimate, 1940 .....   | <u>462,000</u> |
| Increase .....                | <u>15,000</u>  |

PROJECT STATEMENT

| Projects  | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase |
|---|---------|---------------------|---------------------|----------|
| 1. Investigations of nonparasitic diseases of livestock:              |         |                     |                     |          |
| (a) Hemorrhagic septicemia investigations.....                        | \$2,033 | - - -               | - - -               | - - -    |
| (b) Equine encephalomyelitis and forage poisoning investigations..... | 9,535   | \$19,090            | \$19,090            | - - -    |
| (c) Mammitis investigations....                                       | 194     | - - -               | - - -               | - - -    |
| (d) Anaplasmosis investigations.....                                  | 11,324  | 11,415              | 11,415              | - - -    |
| (e) Rabies investigations .....                                       | 3,779   | 5,315               | 5,315               | - - -    |
| (f) Anthrax investigations ....                                       | 5,716   | - - -               | - - -               | - - -    |
| (g) Swine erysipelas investigations .....                             | 5,614   | 6,920               | 6,920               | - - -    |
| (h) Miscellaneous disease investigations .....                        | 16,989  | 23,518              | 23,518              | - - -    |
| (i) Contagious abortion investigations .....                          | 75,279  | 78,182              | 78,182              | - - -    |

1950-1951

[illegible]

Figure 1. The effect of the concentration of the *Agaricus bisporus* spores on the growth of *Agaricus bisporus* and *Agaricus bisporus* spores on the growth of *Agaricus bisporus*.

## PROJECT STATEMENT - Continued

| Projects  | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase |
|---|---------|---------------------|---------------------|----------|
| 1. Investigations of nonparasitic diseases of livestock - Continued:                                  |         |                     |                     |          |
| (j) Stock poisoning by plants investigations.....   | 19,910  | 20,650              | 20,650              | - - -    |
| (k) Poultry disease investigations .....  | 28,975  | 29,890              | 29,890              | - - -    |
| (l) Swamp fever investigations .....  | 13,819  | 15,000              | 15,000              | - - -    |
| (m) Tuberculosis, tuberculin, and reputed immunizing agents, investigations of....                    | 65,548  | 22,500              | 22,500              | - - -    |
| (n) Types of tubercle bacilli, investigations of.....   | 2,755   | 3,000               | 3,000               | - - -    |
| (c) Johne's disease investigations.....   | 2,920   | 3,000               | 3,000               | - - -    |
| (p) Methods of producing immunization against hog cholera, investigations of...                       | 21,020  | 22,495              | 22,495              | - - -    |
| (q) Modes of dissemination of hog cholera, investigations of.....                                     | 5,000   | 5,025               | 5,025               | - - -    |
| (r) Periodic ophthalmia of equines, investigations of....   | 8,911   | 10,000              | 10,000              | - - -    |
| Total, Investigations of non-parasitic diseases of livestock.....                                     | 299,321 | 276,000             | 276,000             | - - -    |
| 2. Investigations of parasitic diseases of livestock:   |         |                     |                     |          |
| (a) Index catalog of medical and veterinary parasitology and maintenance of parasitic collection..... | 8,119   | 8,000               | 8,000               | - - -    |
| (b) Poultry parasites investigations.....   | 17,954  | 18,000              | 18,000              | - - -    |
| (c) Swine parasites investigations.....   | 17,796  | 21,000              | 21,000              | - - -    |
| (d) Parasites causing and transmitting anaplasmosis in cattle, investigations of.                     | 11,458  | 10,400              | 10,400              | - - -    |
| (e) Ox warble and related arthropod parasites investigations.....                                     | 29,242  | 32,000              | 32,000              | - - -    |
| (f) Liver fluke investigations .....  | 15,565  | 20,000              | 20,000              | - - -    |





## PROJECT STATEMENT - Continued

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase   |
|---|----------|---------------------|---------------------|------------|
| 2. Investigations of parasitic diseases of livestock- Continued   |          |                     |                     |            |
| (g) Internal parasites of ruminants, investigations of...   | \$25,844 | \$16,800            | \$21,800            | \$5,000(1) |
| (h) Horse parasite investigations.....  | 8,283    | 10,800              | 10,800              | - - -      |
| (i) Miscellaneous parasites investigations, including parasites of dogs, cats, wild animals, etc.....           | 17,110   | 19,000              | 19,000              | - - -      |
| (j) Anthelmintics and insecticides for the destruction of parasites, investigations for the development of..... | 13,610   | 15,000              | 15,000              | - - -      |
| (k) Trichinosis in swine, investigations of.....  | - - -    | - - -               | 10,000              | 10,000(2)  |
| Total, Investigations of parasitic diseases of animals.....   | 164,981  | 171,000             | 186,000             | 15,000     |
| Transfer from "Animal husbandry", Bureau of Animal Industry.....  | -5,000   | - - -               | - - -               | - - -      |
| Transfer from "Eradicating tuberculosis and Bang's disease", Bureau of Animal Industry.....                     | -5,000   | - - -               | - - -               | - - -      |
| Transfer from "Meat Inspection", Bureau of Animal Industry .....  | -20,000  | - - -               | - - -               | - - -      |
| Unobligated balance.....  | 13,473   | - - -               | - - -               | - - -      |
| Total.....  | 447,775  | 447,000             | 462,000             | 15,000     |

## INCREASE

The increase of \$15,000 in this item for 1940 consists of:

(1) An increase of \$5,000 for investigations of sterility and abortion in cattle caused by a protozoan known as Trichomonas foetus. This parasite is known to be pathogenic to cattle, and small-scale preliminary investigations conducted during the past year have shown that of 7 experimentally infected heifers 1 developed pyometra and became permanently sterile; 5 developed breeding troubles which resulted in delayed conception of from 3 to 6 months; and one of the inoculated heifers and 2 controls became pregnant and calved normally. Observations on the dairy herd at Beltsville, Maryland, have shown that Trichomonas foetus was present in animals which remained sterile despite repeated service by bulls. It is proposed to extend the experimental studies on the relation of Trichomonas to abortion and sterility and to make a survey in several dairies where sterility and abortion are known to be present, in order to determine definitely the role of the organism in the causation of the two patho-



logical conditions mentioned and to secure data upon which to base control measures.

(2) An increase of \$10,000 to provide for investigations on trichinosis in swine. This amount would provide for the institution of a new research project to determine the essential facts regarding the transmission to and diagnosis in swine of trichinosis, a verminous disease capable of producing serious illness and death in man when infested pork is eaten raw or imperfectly cooked. The purpose of the research is to determine the main sources of trichina infection of swine, to develop by laboratory tests and animal experimentation a reliable method of diagnosing trichinosis in living swine, to determine the effects of salt on trichinae, to improve known methods of destroying the vitality of trichinae by refrigeration and by curing of meat food products containing pork muscle tissue.

#### WORK UNDER THIS APPROPRIATION

General.--Items under this appropriation include research into the cause, prevention, and treatment of the infectious, noninfectious, and parasitic diseases of livestock, including poultry, and stock poisoning by plants. These investigations include both field and laboratory studies and have for their object the development of the necessary information that will lead to the formulation of methods for the control and eradication of the various diseases and parasites that are the cause of heavy loss to the livestock industry of this country. Complete information as to the cause and mode of transmission of diseases and parasites is necessary before the most effective measures can be taken for their control. Research in the past has made it possible to formulate and put into effect practical measures for the control and in some cases the eradication of diseases and parasites of high economic importance. This has resulted in great benefit to the livestock industry. Complete information, however, on many important diseases and parasites is still lacking so that effective measures for the reduction of losses occasioned by them must await further research.

1. Investigations of Nonparasitic Diseases of Livestock.--This project consists of research into methods of diagnosis, cause, mode of transmission, and methods of prevention, treatment, and control of the more important infectious and noninfectious diseases of livestock, including poultry. Work is conducted along the lines indicated in the projects listed below:

(a) Hemorrhagic Septicemia Investigations.--Work under this project was discontinued in 1939.

(b) Equine Encephalomyelitis and Forage Poisoning Investigations.--Losses in horses in various parts of the country have occurred for many years which until a few years ago had been generally considered to be due to spoiled forage (forage poisoning). Particularly severe losses have occurred in certain years. In 1930 it was shown that a severe epizootic in horses in California was due to an infectious agent, a filterable virus, producing an inflammation of the brain and spinal cord (encephalomyelitis).



The specific virus disease has been definitely identified by laboratory means in 27 States and has been diagnosed clinically or pathologically in at least 13 other States. Further work is under way to determine positively the existence of the virus disease in the latter States. Additional information is being sought on the modes of transmission, including an explanation of the manner in which the infection is carried over from one epizootic to another and on improved methods of diagnosis and means of immunizing horses against the disease. During 1938 the virus of this disease was found to be the cause of encephalitis in children in Massachusetts. This is the first authentic report of the infection in man. Recent outbreaks of a somewhat similar disease following in the wake of the virus infection are being investigated.

(c) Mammitis Investigations.---Work under this project was discontinued in 1939.

(d) Anaplosmosis Investigations.---Anaplasmosis is a disease of cattle somewhat similar to tick fever. It was definitely recognized in the United States in 1924 and now exists in about 21 States. Control measures employed in other countries are not applicable to this country. The objective in these investigations is to determine the modes of transmission of the disease and to develop a serological test for the diagnosis of the carrier animals. Although means of partially controlling the disease have been found, the development of an immunizing agent that is both safe and effective is an object of these investigations, as is also the determination of effective therapeutic means of combating the disease and freeing the carrier animal of infection.

(e) Rabies Investigations.---This project covers studies on the diagnosis and methods of control of rabies in dogs and other animals. In recent years particular attention has been given from time to time to a study of the efficacy of the prophylactic vaccination of dogs as a means of controlling outbreaks of the disease.

(f) Anthrax Investigations.---Work under this project was discontinued in 1939.

(g) Swine Erysipelas Investigations.---It has been found in recent years that swine erysipelas in the acute and chronic form exists in a number of the States. These investigations are conducted in an endeavor to improve on the agglutination test for the diagnosis of the disease so that this may be made available for a practical field test for the diagnosis of the disease. Studies are being made on the factors that enhance the pathogenicity of the causative agent of the disease and on outbreaks of the disease in the field, the latter to gain information on control measures. Experiments are being conducted to develop a safe and effective means of vaccination where the disease occurs in large hog-breeding and feeding establishments.

(h) Miscellaneous Disease Investigations.---The diseases falling in this group, which include glanders, blackleg, paratyphoid infection of swine, foot-rot, alkali disease, anthrax, hemorrhagic septicemia, and other miscellaneous diseases and pathological conditions of animals, are at this time subjects for study as occasion demands. While some of these diseases were





at one time major problems, earlier special studies resulted in finding effective means for their control. The present activities concerning these diseases are largely those of diagnosis, since proper diagnosis is the first essential in formulating measures to combat outbreaks of disease.

(i) Contagious Abortion Investigations.---Abortion disease has for many years been growing in importance until it now ranks first among diseases that plague the dairy and cattle-raising industries. The object of this research is to gain sufficient knowledge of the disease to be able to at least reduce its ravages and, if possible, bring it under control and eradicate it.

(j) Stock Poisoning by Plants.---The losses in livestock caused by poisonous plants are frequently very severe. It is estimated that the average annual loss is about one million dollars and in some years may reach several times that figure. Work is being carried on to determine what plants are responsible for these losses and to find means to prevent poisoning and to treat affected animals. The cause of a serious disease which has resulted in an annual loss of several thousand sheep has been traced to two poisonous plants. This discovery made it possible to formulate practical means for avoiding the plants and eliminating the losses. Poisoning of livestock by prussic-acid-bearing plants has resulted in losses in every part of the United States. An effective remedy for this type of poisoning has been developed and is being used wherever such plants cause trouble.

(k) Poultry Disease Investigations.---The principal diseases now under investigation are laryngotracheitis, range paralysis, tuberculosis, pullorum diseases, and fowl pox. These are widespread in distribution and are the cause of heavy losses to the poultry industry. In addition, a number of diseases to which poultry is susceptible but which are of lesser economic importance are subjects for study as suitable material becomes available and facilities permit. The objective is to formulate adequate control measures.

(l) Swamp Fever Investigations.---Swamp fever is a widely distributed disease of horses and mules which at times has been of economic importance in certain sections of the United States. In 1927 the disease assumed economic proportions in the Mississippi Delta region, and investigations are now being conducted looking to the development of some treatment that will be effective either as a preventive or as a cure for the disease. Work is being conducted to develop a test for the detection of carriers of the infection as a means of controlling and eventually eradicating the disease.

(m) Tuberculosis, Tuberculin, and Reputed Immunizing Agents.---The investigation of animal tuberculosis was one of the earliest major projects of the Bureau of Animal Industry. Much has been learned of the nature of the disease, the manner in which it is spread, the methods of diagnosis, and means of prevention and control. Present methods of eradicating the disease are based on this work. The object of this investigation is to gain knowledge relative to the disease which will make possible its eradication in cattle, hogs, chickens, and other animals affected by the different types of tubercle bacilli.



(n) Types of Tubercle Bacilli.--In specimens representing lesions found in tuberculin reactor animals slaughtered in connection with the national program of tuberculosis eradication the finding of tubercle bacilli confirms the tuberculin test. The object of this investigation is to determine the types of tubercle bacilli, whether bovine, human, or avian, that are found in these lesions, in order to furnish the information necessary from the standpoint of tuberculosis eradication.

(o) Johne's Disease.--Johne's disease (paratuberculosis) is a malady of cattle which, like tuberculosis, is caused by acid-fast microorganisms. Like tuberculosis, infection in the early stage of the disease can not be detected by clinical means, yet these animals may be spreaders of the infection to healthy cattle. While the disease has been recognized in the United States for a number of years, it apparently is becoming more prevalent and is causing considerable loss, especially in the dairy industry. A diagnostic agent similar to tuberculin and known as Johnin was developed in 1914. A commercially prepared intravenous Johnin became available in 1927 but proved rather unsatisfactory. In 1932 the Bureau began the preparation of an intradermic Johnin similar to intradermic tuberculin. This product, while more satisfactory than the intravenous Johnin, is as yet in an experimental stage. The object of this investigation is to improve the intradermic Johnin, looking to the ultimate development of a diagnostic agent as effective as intradermic tuberculin, and to apply this product in the field for the detection of infected animals so they may be removed from the herds.

(p) Methods of Producing Immunization Against Hog Cholera. --At times hog cholera has severely injured the hog-raising industry, losses having reached 6,000,000 hogs (valued at \$65,000,000) in a single year. Present methods of immunization are expensive and not invariably safe or successful. A cheaper and more dependable method is being sought, either through improved utilization of virus and serum or through a harmless but effective vaccine.

(q) Modes of Dissemination of Hog Cholera.--Hog cholera is highly contagious. The avenues by which infectious matter is conveyed from sick hogs to well hogs are studied in order to determine where and how infection may be strategically blocked.

(r) Investigations of Periodic Ophthalmia of Equines.--Periodic ophthalmia of equines has been known to exist in the United States for many years and is characterized by a recurring inflammation of the eye which usually terminates in blindness of one or both eyes. The condition is quite widespread, particularly in the Middle West and East. Indications are that the disease is on the increase. While it is rather difficult to estimate the losses occasioned annually by this disease, they are known to be heavy. Little is known about the cause of the disease but it is generally believed to be of an infectious nature of the type of a filterable virus. Research work on periodic ophthalmia is handicapped by the fact that the experiments must be conducted on horses and mules, which makes the procedure quite expensive. As a result, experimental work, both in this country and abroad, has been very limited, and little or no information of practical value in the control of the disease has yet been developed.



2. Investigations of Parasitic Diseases of Livestock.--Investigations are conducted on animal parasites, including studies of their morphology, life history, biology, pathogenicity, and of control measures by means of treatment and prophylaxis. The more important parasite groups covered include the protozoa, nematodes, tapeworms, flukes, insects, and arachnids attacking domesticated and game animals, including birds. The basic work makes possible the precise identification and recognition of parasites and gives the information on which to base control measures. Therapy is established on the basis of citrical tests of drugs. Work is conducted along the lines indicated in the projects listed below:

(a) Index Catalog of Medical and Veterinary Parasitology and Maintenance of Parasite Collection.--The object of this project is to maintain a complete catalog and index of the world's literature on parasitology. This index catalog provides a basis for research and affords prompt information in answering correspondence and in solving problems that arise in connection with the Bureau's regulatory work.

(b) Poultry Parasite Investigations.--The poultry industry of the United States suffers large losses because of parasites of poultry. The objective of these investigations is to develop methods of protecting the industry from such losses by ascertaining through research effective control measures.

(c) Swine Parasite Investigations.--Swine parasites are the cause of large losses to the industry. The object of the work under this project is to lay a foundation of scientific fact on which to build measures for the control of parasites and to make available to the industry the data obtained so that losses may be reduced.

(d) Parasites Causing and Transmitting Anaplasmosis in Cattle.--In 1924 and 1925 it was found that anaplosmosis was prevalent in the United States in areas outside the region in which cattle-fever ticks were present, indicating that the eradication of the cattle tick, although resulting in the suppression of piroplasmosis, did not control anaplasmosis. Consequently the problem of anaplasmosis was made a project for consideration, the object being to ascertain what vectors carry anaplasmosis and to develop control measures of any practical sort.

(e) Ox-Warble and Related Arthropod Parasite Investigations.--The object of this project is (1) to lay a foundation for the eradication of ox-warbles from the United States, since these parasites cause losses, principally by damage to hides, amounting to millions of dollars annually; (2) to develop practical methods of controlling grub in the head of sheep; and (3) to ascertain effective methods of controlling demodectic mange and other parasitic diseases that damage the hides of livestock.

(f) Liver Fluke Investigations.--A survey of the fluke situation in 1912 indicated that the sheep liver fluke was prevalent along the Pacific Coast and the Gulf Coast, with extensions up certain river valleys to inland States. More recent surveys indicated that the fluke was spreading



1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations

$$\begin{cases} \Delta u = f(x, y, z, u, v, w) \\ \Delta v = g(x, y, z, u, v, w) \\ \Delta w = h(x, y, z, u, v, w) \end{cases} \quad (1)$$

where  $f, g, h$  are functions of the variables  $x, y, z, u, v, w$  and the Laplacian  $\Delta$  is defined by the formula

$$\Delta u = \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2}$$

over the domain  $D$  of the variables  $x, y, z$ . The boundary conditions are assumed to be of the form

$$u = \phi(x, y, z), \quad v = \psi(x, y, z), \quad w = \chi(x, y, z) \quad (2)$$

on the boundary  $S$  of the domain  $D$ . The functions  $\phi, \psi, \chi$  are assumed to be continuous and have continuous first derivatives on  $S$ .

In the second part of the paper the author considers the case when the functions  $f, g, h$  are linear in the variables  $u, v, w$  and the system (1) can be written in the form

$$\Delta u = A_1 u + A_2 v + A_3 w + F(x, y, z)$$

where  $A_1, A_2, A_3$  are constants and  $F$  is a function of the variables  $x, y, z$ . The boundary conditions (2) are assumed to be homogeneous, i.e.  $\phi = \psi = \chi = 0$  on  $S$ .

In the third part of the paper the author considers the case when the functions  $f, g, h$  are quadratic in the variables  $u, v, w$  and the system (1) can be written in the form

$$\Delta u = A_1 u^2 + A_2 v^2 + A_3 w^2 + F(x, y, z)$$

where  $A_1, A_2, A_3$  are constants and  $F$  is a function of the variables  $x, y, z$ . The boundary conditions (2) are assumed to be homogeneous, i.e.  $\phi = \psi = \chi = 0$  on  $S$ .

In the fourth part of the paper the author considers the case when the functions  $f, g, h$  are cubic in the variables  $u, v, w$  and the system (1) can be written in the form

$$\Delta u = A_1 u^3 + A_2 v^3 + A_3 w^3 + F(x, y, z)$$

where  $A_1, A_2, A_3$  are constants and  $F$  is a function of the variables  $x, y, z$ . The boundary conditions (2) are assumed to be homogeneous, i.e.  $\phi = \psi = \chi = 0$  on  $S$ .



and was present in about 30 States, including many which were free from flukes in 1912. The damage to cattle livers alone has become an important item in connection with the increased value of livers in the treatment of pernicious anemia in man. In some sections of the United States a sizable percentage of the lamb crop succumbs to liver fluke infestation.

(g) Internal Parasites of Ruminants.---Previous investigations have developed or standardized several treatments for stomach worms and other round-worms of sheep. The object of the project is to ascertain the basic facts in connection with cattle and sheep parasites and to develop treatments and control measures. Parasites cause more losses in sheep than do any other disease agencies and in many places are the limiting factor in sheep production. A breeding disease of cattle, trichomonad infection, is known to produce an infection of the uterus, abortion, and sterility.

(h) Horse Parasite Investigations.---Horses in general are menageries of parasites, many of which are highly injurious and the cause of considerable losses. The object of the work under this project is to lay a foundation of scientific fact on which to build control measures and to make available to the people of the United States the data obtained so that losses may be reduced.

(i) Miscellaneous Parasite Investigations, including Parasites of Dogs, Cats, Wild Animals, etc.---Parasites of sheep, goats, and cattle are identical in many cases with parasites affecting deer and other wild ruminants, and some of our most important parasites of sheep and cattle have originated as parasites of wild ruminants in recent times. The same is true of parasites of domesticated and wild birds and other animals, and any competent study of parasites of domesticated animals must take cognizance of parasites of wild animals. A number of parasites of dogs are transmissible to man, and this fact gives the parasites of dogs special importance.

(j) Anthelmintics and Insecticides for the Destruction of Parasites.---The original object of this project was to establish the value of drugs in common use or at least recommended in the literature for the control of live-stock parasites. This has been done. The next objective was to develop more effective drugs, and this has been done in some cases and is still being carried on effectively. A further objective is to ascertain basic correlations between the efficacy of a drug and the chemical composition and physical properties of the drug, and such investigations are now actively under way.



## (e) ERADICATING TUBERCULOSIS AND BANG'S DISEASE

|                               |                  |
|-------------------------------|------------------|
| Appropriation Act, 1939 ..... | \$5,403,000*     |
| Budget Estimate, 1940 .....   | 9,800,000**      |
| Increase .....                | <u>4,397,000</u> |

\*Together with \$7,827,000 of the unobligated balances of the funds made available by the Jones-Connally Act of May 25, 1934, and section 37 of the Act of August 24, 1935. See Project Statement and explanation which follow.

\*\*Together with the unexpended balance of Jones-Connally and section 37 funds (Act of August 24, 1935), estimated at \$1,227,000. See Project Statement and explanation which follow:

## PROJECT STATEMENT

| Project   | 1938            | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase<br>or<br>decrease |
|---|-----------------|---------------------|---------------------|----------------------------|
| 1. Eradicating tuberculosis in livestock (including poultry)...   | (a) \$1,000,103 | \$1,732,116         | \$1,732,116         | - - -                      |
| 2. Indemnities for cattle slaughtered on account of tuberculosis.....   | (a) 489,321     | 999,884             | 999,884             | - - -                      |
| 3. Tuberculin testing at public stockyards.....   | 69,532          | 71,000              | 71,000              | - - -                      |
| 4. Combating Bang's disease in cattle.....  | (b)             | 2,700,000           | 2,700,000           | - - -                      |
| 5. Indemnities for cattle slaughtered on account of Bang's disease.....   | (b)             | 6,400,000           | 5,424,000           | -\$976,000                 |
| 6. Experimentation in diseases of livestock.....  | (b)             | 100,000             | 100,000             | - - -                      |
| Total obligated.....  | (c) 1,558,956   | 12,003,000          | 11,027,000          | - 976,000                  |
| Unobligated balance, regular funds.....   | 39,044          | - - -               | - - -               | - - -                      |
| Deduct: Unobligated balances, Jones-Connally and section 37 funds reappropriated under this head for 1939 and 1940..... | - - -           | -7,827,000          | -1,227,000          | +6,600,000                 |
| Add: 1939 unobligated balance of reappropriated special funds...  | - - -           | 1,227,000           | - - -               | -1,227,000                 |
| Transfer to "Diseases of Animals" Bureau of Animal Industry.....  | 5,000           |                     |                     |                            |
| Total, regular appropriation.....   | 1,603,000       | 5,403,000           | 9,800,000           | +4,397,000(1)              |

(a) Also financed with special funds. (See Table I, which follows.)

(b) Financed with special funds. (See Table I, which follows.)

(c) Exclusive of special funds used for this purpose. (See Table I, which follows.)

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## INCREASES AND DECREASES

- (1) While this is an apparent increase of \$4,397,000 for 1940 over 1939, actually there is a decrease in working funds available. (See explanatory paragraph and Table I which follow.)

- - - - - 0 - - - - -

Tuberculosis eradication has been in progress since 1917. Since 1934 both regular and special funds (Jones-Connally and Section 37, Act of August 24, 1935) have been used for this purpose. Bang's disease control was inaugurated in the fiscal year 1935 and this work, together with special experimental work on livestock diseases, as authorized by Section 37, was financed exclusively with special funds through the fiscal year 1938. The 1939 Agricultural Appropriation Act provided for the continuation of tuberculosis eradication and Bang's disease control and special experimentation under one consolidated appropriation item entitled "Eradicating Tuberculosis and Bang's Disease", with a direct appropriation of \$5,403,000, together with the unexpended balance of the special funds, then estimated at \$6,600,000, making in all \$12,003,000, which is the amount allotted for these purposes in 1939.

The unexpended balance of special funds, estimated in 1939 to be \$6,600,000, is now estimated to be \$7,827,000, or \$1,227,000 in excess of our earlier estimate. This \$1,227,000 is estimated for reappropriation in the 1940 Budget, together with a direct appropriation of \$9,800,000, making in all \$11,027,000, or \$976,000 less than the amount allotted for 1939.

Table I, which follows, shows obligations of regular and special funds for the fiscal years 1934 through 1938; allotments, 1939; and the Budget Estimate, 1940.

Table II shows, by States and Territories, the allotments of funds for tuberculosis and Bang's disease work during the fiscal year 1939.

Table III shows the status of Jones-Connally and Section 37 funds, from which the unexpended balance will be available for 1940.





TABLE I

## STATEMENT OF OBLIGATIONS AND ALLOTMENTS FOR ERADICATING TUBERCULOSIS, COMBATING BANG'S DISEASE, AND SPECIAL EXPERIMENTATION IN DISEASES OF LIVESTOCK, FISCAL YEARS 1934-1940

| Projects   | Obligations,<br>1934 | Obligations,<br>1935 | Obligations,<br>1936 | Obligations,<br>1937 | Obligations,<br>1938 | Allotments,<br>1939 | Budget<br>estimate,<br>1940 |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|-----------------------------|
| <u>Eradicating Tuberculosis:</u>                     |                      |                      |                      |                      |                      |                     |                             |
| Regular Funds .....                                  | \$3,877,293          | \$1,966,490          | \$1,636,317          | \$1,429,514          | \$1,558,956          | \$1,603,000         | \$2,803,000                 |
| Jones-Connelly and<br>Section 37 .....               | - - -                | 9,500,000            | 5,961,671            | 2,720,962            | 1,775,000            | 1,200,000           | - - -                       |
| Total, Eradicating<br>Tuberculosis                   | 3,877,293            | 11,466,490           | 7,598,488            | 4,150,476            | 3,333,956            | 2,803,000           | 2,803,000                   |
| <u>Combating Bang's Disease:</u>                     |                      |                      |                      |                      |                      |                     |                             |
| Regular Funds .....                                  | - - -                | - - -                | - - -                | - - -                | - - -                | 3,800,000           | 6,997,000                   |
| Jones-Connelly and<br>Section 37 .....               | - - -                | 10,687,175           | 14,345,116           | 13,481,908           | 11,653,062           | 5,300,000           | 1,127,000                   |
| Total, Combating<br>Bang's Disease .....             | - - -                | 10,687,175           | 14,345,116           | 13,481,908           | 11,653,062           | 9,100,000           | 8,124,000                   |
| <u>Experimentation in Diseases<br/>of Livestock:</u> |                      |                      |                      |                      |                      |                     |                             |
| Section 37 .....                                     | - - -                | - - -                | 13,297               | 106,130              | 129,538              | 100,000             | 100,000                     |
| Total, Regular and<br>Special Funds .....            | 3,877,293            | 22,153,665           | 21,956,901           | 17,738,514           | 15,116,556           | 12,003,000          | 11,027,000                  |



TABLE II

## ERADICATING TUBERCULOSIS AND BANG'S DISEASE

1939 Allotments  
(Combined funds)

| State  | Eradicating<br>Tuberculosis |                  | Combating<br>Bang's Disease |                  | Total     |
|--|-----------------------------|------------------|-----------------------------|------------------|-----------|
|  | Salaries<br>and<br>Expenses | Indemni-<br>ties | Salaries<br>and<br>Expenses | Indemni-<br>ties |           |
| Eradicating tubercu-<br>losis and combating<br>Bang's disease: |                             |                  |                             |                  |           |
| Alabama .....  | \$20,000                    | \$1,000          | \$105,000                   | \$110,000        | \$236,000 |
| Arizona .....  | 20,000                      | 1,000            | 5,000                       | 10,000           | 36,000    |
| Arkansas .....   | 10,000                      | 2,000            | 120,000                     | 160,000          | 292,000   |
| California .....   | 216,000                     | 300,000          | 2,000                       | 5,000            | 523,000   |
| Colorado .....   | 5,000                       | 1,000            | 20,000                      | 15,000           | 41,000    |
| Connecticut .....  | 20,000                      | 10,000           | 4,000                       | 20,000           | 54,000    |
| Delaware .....   | 5,000                       | 1,000            | 10,000                      | 55,000           | 71,000    |
| District of Columbia.  | 101,500                     | - - -            | 90,000                      | - - -            | 191,500   |
| Florida .....  | 15,000                      | 2,000            | 66,000                      | 160,000          | 243,000   |
| Georgia .....  | 20,000                      | 1,000            | 50,000                      | 100,000          | 171,000   |
| Idaho .....  | 15,000                      | 2,000            | 40,000                      | 100,000          | 157,000   |
| Illinois .....   | 25,000                      | 40,000           | 50,000                      | 160,000          | 275,000   |
| Indiana .....  | 40,000                      | 20,000           | 60,000                      | 160,000          | 280,000   |
| Iowa .....   | 50,000                      | 158,884          | 100,000                     | 300,000          | 608,884   |
| Kansas .....   | 45,000                      | 15,000           | 45,000                      | 160,000          | 265,000   |
| Kentucky .....   | 25,000                      | 5,000            | 59,000                      | 100,000          | 189,000   |
| Louisiana .....  | 90,000                      | 3,000            | 50,000                      | 150,000          | 293,000   |
| Maine .....  | 20,000                      | 2,000            | 15,000                      | 50,000           | 87,000    |
| Maryland .....   | 30,000                      | 5,000            | 40,000                      | 110,000          | 185,000   |
| Massachusetts .....  | 20,000                      | 15,000           | 10,000                      | 8,000            | 53,000    |
| Michigan .....   | 30,000                      | 15,000           | 89,000                      | 160,000          | 294,000   |
| Minnesota .....  | 30,000                      | 20,000           | 135,000                     | 405,000          | 590,000   |
| Mississippi .....  | 35,000                      | 2,000            | 38,000                      | 80,000           | 155,000   |
| Missouri .....   | 25,000                      | 2,000            | 125,000                     | 260,000          | 412,000   |
| Montana .....  | 25,000                      | 2,000            | 25,000                      | 90,000           | 142,000   |
| Nebraska .....   | 35,000                      | 5,000            | 35,000                      | 90,000           | 165,000   |
| Nevada .....   | 15,000                      | 1,000            | 20,000                      | 50,000           | 86,000    |
| New Hampshire .....  | 10,000                      | 5,000            | 15,000                      | 60,000           | 90,000    |
| New Jersey .....   | 15,000                      | 5,000            | 10,000                      | 20,000           | 50,000    |
| New Mexico .....   | 25,000                      | 2,000            | 32,000                      | 20,000           | 79,000    |
| New York .....   | 55,000                      | 120,000          | 80,000                      | 210,000          | 465,000   |
| North Carolina .....   | 20,000                      | 1,000            | 44,000                      | 110,000          | 175,000   |
| North Dakota .....   | 40,000                      | 3,000            | 30,000                      | 80,000           | 153,000   |
| Ohio .....   | 25,000                      | 20,000           | 90,000                      | 270,000          | 405,000   |
| Oklahoma .....   | 30,000                      | 5,000            | 100,000                     | 270,000          | 405,000   |
| Oregon .....   | 30,000                      | 5,000            | 105,000                     | 270,000          | 410,000   |
| Pennsylvania .....   | 35,000                      | 80,000           | 105,000                     | 370,000          | 590,000   |

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TABLE II - Continued

## ERADICATING TUBERCULOSIS AND BANG'S DISEASE - Continued

1939 Allotments  
(Combined funds) - Continued.

| State   | Eradicating Tuberculosis |             | Combating Bang's Disease |             | Total      |
|---|--------------------------|-------------|--------------------------|-------------|------------|
|   | Salaries and Expenses    | Indemnities | Salaries and Expenses    | Indemnities |            |
| Eradicating tuberculosis and combating Bang's disease - Continued |                          |             |                          |             |            |
| Rhode Island .....  | \$9,000                  | \$2,000     | \$1,000                  | \$7,000     | \$19,000   |
| South Carolina .....  | 10,000                   | 1,000       | 40,000                   | 50,000      | 101,000    |
| South Dakota .....  | 100,616                  | 20,000      | 40,000                   | 110,000     | 270,616    |
| Tennessee .....   | 25,000                   | 1,000       | 60,000                   | 110,000     | 196,000    |
| Texas .....   | 60,000                   | 5,000       | 40,000                   | 225,000     | 330,000    |
| Utah .....  | 15,000                   | 3,000       | 30,000                   | 50,000      | 98,000     |
| Vermont .....   | 25,000                   | 20,000      | 11,000                   | 20,000      | 76,000     |
| Virginia .....  | 35,000                   | 5,000       | 110,000                  | 140,000     | 290,000    |
| Washington .....  | 50,000                   | 5,000       | 110,000                  | 250,000     | 415,000    |
| West Virginia .....   | 15,000                   | 2,000       | 49,000                   | 50,000      | 116,000    |
| Wisconsin .....   | 70,000                   | 50,000      | 172,000                  | 600,000     | 892,000    |
| Wyoming .....   | 10,000                   | 1,000       | 18,000                   | 40,000      | 69,000     |
| Alaska .....  | - - -                    | - - -       | - - -                    | - - -       | - - -      |
| Hawaii .....  | 5,000                    | 2,000       | - - -                    | - - -       | 7,000      |
| Puerto Rico .....   | 30,000                   | 5,000       | - - -                    | - - -       | 35,000     |
| Total .....   | 1,732,116                | 999,884     | 2,700,000                | 6,400,000   | 11,832,000 |
| Eradicating tuberculosis and Bang's disease .....                 |                          |             |                          |             | 11,832,000 |
| Tuberculin testing at public stockyards .....                     |                          |             |                          |             | 71,000     |
| Experimentation in diseases of livestock .....                    |                          |             |                          |             | 100,000    |
| GRAND TOTAL .....   |                          |             |                          |             | 12,003,000 |





TABLE III

STATEMENT SHOWING STATUS OF  
\$150,000,000 JONES-CONNALLY FUNDS  
AND \$10,000,000 MADE AVAILABLE BY  
SECTION 37 OF ACT OF AUGUST 24, 1935

|  | Amount                    |
|--|---------------------------|
| Obligated 1934-1938 and Allotments 1939: |                           |
| Elimination of Diseased Cattle:          |                           |
| Eradicating Tuberculosis .....           | \$21,157,633              |
| Combating Bang's Disease .....           | 55,467,199                |
| Combating Mastitis .....                 | 885,000                   |
| Experimentation in Diseases of           |                           |
| Livestock .....                          | 349,427                   |
| Total, Elimination of Diseased Cattle    | <u>77,859,259</u>         |
| Removal of Surpluses:                    |                           |
| Dairy Products .....                     | 17,177,338                |
| Cattle Purchases .....                   | <u>63,736,373</u>         |
| Total, Removal of Surpluses .....        | 80,913,741                |
| Estimated for Reappropriation for 1940:  |                           |
| For Eradicating Tuberculosis, Combating  |                           |
| Bang's Disease, and Experimentation      |                           |
| in Diseases of Livestock .....           | <u>1,227,000</u>          |
| Total.....                               | <u><u>160,000,000</u></u> |

CHANGES IN LANGUAGE

It is recommended that the language of this paragraph be amended to read as follows:

"Eradicating tuberculosis and Bang's disease: For the control and eradication of the diseases of tuberculosis and paratuberculosis of animals, avian tuberculosis, and Bang's disease of cattle \$ , together with the unobligated balances of the funds reappropriated under this head for the fiscal year 1939 by the Agricultural Appropriation Act for that year from unobligated balances of funds made available by the Act of May 25, 1934 (48 Stat. 805), and section 37 of the Act of August 24, 1935 (49 Stat. 775-776) \*\*\*\*\* [Provided further, That indemnity payments may be made for cattle slaughtered prior to May 1, 1939, even though the State, Territory, county, or municipality where animals are condemned has made no payment or has not equaled the Federal payment, but in no case arising under this proviso shall the Federal payment exceed the highest amount authorized to be paid at the time by the Federal Government in similar cases in any State contributing to such indemnity payments; and this proviso shall apply only to Bang's disease work:]

1918

1. The first part of the report  
deals with the general  
principles of the  
theory of the  
subject.

2. The second part of the report  
deals with the  
application of the  
principles to the  
case of the  
subject.

3. The third part of the report  
deals with the  
conclusion of the  
report.

4. The fourth part of the report  
deals with the  
conclusion of the  
report.

Provided further, That not to exceed \$100,000 of the amount herein made available may be used for continuation of scientific experimentation in diseases of livestock as authorized by section 37 of the Act of August 24, 1935 (7 U.S.C. 612b)."

The first change is an addition to the present language relating to reappropriated funds, the purpose of which is to clearly identify the reappropriated funds for 1940 as the balances remaining unobligated on June 30, 1939, from funds provided by the Act of May 25, 1934, and Section 37 of the Act of August 24, 1935, and reappropriated in the Agricultural Appropriation Act for the fiscal year ending June 30, 1939.

The second change strikes out a proviso that ceases to be applicable on May 1, 1939.

#### WORK UNDER THIS APPROPRIATION

General.--The object of this work is to assist in a campaign to control and eradicate tuberculosis and Bang's disease among livestock in cooperation with the various States, Alaska, Hawaii, and Puerto Rico.

1. Eradicating Tuberculosis in Livestock (Including Poultry).--Tuberculosis, when present, is an important disease of cattle, swine, and poultry because of its effect in reducing production and causing a loss of meat condemned as unfit for food. The cooperative tuberculosis eradication work conducted by this Bureau and the various State livestock sanitary authorities has been in operation since 1917, and there has been a marked reduction in the amount of infection in areas where the work has been performed. During the first few years of the campaign the work was confined chiefly to the tuberculin testing of individual herds of cattle, either on a voluntary basis or under the rules and regulations in effect in the States in which the herds were located. This feature of the work was followed by what is known as the area plan, which consists of the tuberculin testing of all the cattle in a given area, such as a county. The reactors are removed for slaughter, and the premises previously occupied by them are thoroughly cleaned and disinfected. Retests of infected herds are conducted at proper intervals, and, if the infection is found to be more than one percent, the entire cattle population is again tuberculin tested and the same procedure followed. There is an exception to this method, however, in cases where the infection does not exceed two percent, where it is possible to limit the testing to about 20 percent of the herds of cattle in the county. This work is conducted under uniform rules and regulations established by the United States Livestock Sanitary Association and agreed to by the various State livestock sanitary officials and the Bureau of Animal Industry. When the degree of infection among the cattle in a county is found to be less than one-half of one percent, the county is declared to be a modified tuberculosis-free accredited area. In July, 1923, the first counties in the United States were given that classification, and each month since that time additional counties have been so classified. On July 1, 1938, 3,051 counties, or 99.5 percent of all the counties, were in the modified accredited area. All the counties in 47 States are now



in that status. In the 15 remaining counties in California tuberculosis eradication work is progressing, and it is expected that most of these counties will be classified as modified accredited areas in about one year.

It is necessary to conduct a certain amount of retesting of cattle in the modified accredited areas, which necessitates the employment of veterinarians in the field to perform the work. Part of the work is done by State and county veterinarians and part by employees of this Bureau. Some work on this project is also conducted in Puerto Rico, Hawaii, and Alaska in cooperation with the Territorial officials.

Since the cooperative work was undertaken in 1917, approximately 3,651,500 reactors have been removed from the herds of cattle in this country. During the fiscal year 1938 tuberculin tests were applied to 14,108,871 cattle, disclosing 89,359 reactors or 0.6 percent. On June 30, 1938, there were 269,095 fully accredited tuberculosis-free herds, containing approximately 3,807,000 cattle.

Tuberculosis among poultry is very prevalent in the Central and North Central States. The disease is caused by the avian type of bacilli, which is readily transmitted to swine. In swine it may progress to a point where it becomes generalized, but in most of the carcasses showing evidence of the disease on post-mortem, only slight lesions of the cervical or mesenteric lymph glands are found. Avian tuberculosis is particularly difficult to eradicate because of the fact that the organisms are so resistant. The bacilli will live for many months in the soil if protected by dirt or other material. It is quite a common practice, in many localities where the disease exists, for the poultry and swine to occupy the same premises during at least a part of the day. This is a practice that will cause the disease to spread among swine. In combating avian tuberculosis, the veterinarians employed in the field cooperate with the local livestock sanitary officials and the owners of poultry flocks. Cooperation is also obtained from certain local organizations and the owners of hatcheries.

During the fiscal year 1938 some work on this project was conducted on an intensive basis in selected townships. All the poultry and swine in those townships were tuberculin tested, the reactors removed, and the premises disinfected as far as possible. This method has created considerable interest among the flock owners, and the plan will be continued. In some States a considerable amount of work has been done in connection with the tuberculin testing of flocks of poultry from which eggs are supplied to commercial hatcheries. In case reactors are found, they are removed from the flock, and retests of the remaining fowls conducted at proper intervals. One of the most important features in connection with the avian tuberculosis eradication project is to dispose of the older fowls and those that have completed their first laying period. This practice, in most instances, has been found a profitable one.

Much information along this line is furnished the flock owners by veterinarians engaged in the tuberculin testing of cattle. This can be done with very little additional expense due to the fact that the veterinarians can observe the flocks and discuss the subject with the owner while they are on the premises applying the tuberculin test to the cattle. During





the past fiscal year it was possible for these veterinarians to observe approximately 128,000 flocks, containing about 14,850,000 fowls, located in 11 States. About 15 veterinarians of the Bureau devoted practically all their time to the avian tuberculosis project. These veterinarians visited about 9,000 farms, observing about 1,150,000 fowls. Infection was reported on 1,582 of these farms. They also conducted a considerable amount of tuberculin testing of poultry and swine and disseminated information regarding the disease in various ways.

Paratuberculosis or Johne's disease exists to some extent among cattle in the United States. This is a difficult disease on which to make a diagnosis. However, some herds were tested during the fiscal year 1938 and 293 reactors, or 7.2 percent, were removed and condemned.

2. Indemnities for Cattle Slaughtered on Account of Tuberculosis.--In most States provision has been made for payment to owners of tuberculous cattle by the Federal Government when the State makes a similar or greater payment, but during the past four years it has been possible for the Federal Government to make such payment in cases where no State payment is made. It has therefore been possible to extend the work to sections of the country where no local funds are available. During the fiscal year 1938 State, county, and Territorial appropriations amounted to approximately \$4,000,000, of which about \$1,000,000 was for indemnity. The maximum Federal payment is \$25 for grade cattle and \$50 for registered purebred cattle.

3. Tuberculin Testing at Public Stockyards.--The purpose of this work is to supervise the tuberculin testing of cattle at public stockyards to detect and remove tuberculous animals, thereby preventing their further transportation and the spread of tuberculosis to farm herds at destinations; also to expedite the movement through the yards to slaughtering establishments of animals which have reacted to the tuberculin and Bang's disease tests.

4. Combating Bang's Disease in Cattle.--Bang's disease among cattle, which is found in practically all sections of the United States, is a serious menace to the cattle industry. It is found to be much more prevalent in some localities than in others, the higher degree of infection being found in the larger herds of cattle where there has been a considerable exchange in the number of animals. It is also more prevalent in the larger milkshed areas. The elimination of this disease was taken up in a cooperative manner in July, 1934, with emergency funds, and arrangements made to test the cattle and make Federal payment to the owners for reactors slaughtered, in addition to the salvage obtained by the owners.

There has been a very great demand for this work on the part of the cattle owners in many sections of the United States. During the fiscal year 1938 approximately 7,850,000 tests for this disease were applied to cattle, disclosing about 324,500 reactors, or 4.1 percent. Of these tests, a considerable number were retests applied at proper intervals.



This project is conducted on an individual herd basis and is voluntary as far as the Federal Government is concerned. It is also conducted under what is known as the area plan in several States where the disease does not exist to a very high degree and where the sentiment of the cattle owners is much in favor of conducting the work on that basis. When work is taken up under the area plan, all the cattle in the area, except steers and calves under six months of age, are tested and the reactors removed. This work is followed by the required amount of retesting. The owners are given instructions as to the proper sanitary methods to follow in order to eliminate the disease, as proper sanitation is a very important factor in its eradication. At the close of the fiscal year 1938 approximately 1,035,000 herds, containing about 9,500,000 cattle, were under supervision throughout the United States.

The work has developed much faster in some States than in others. In three States more than 50 percent of the cattle are under supervision, while in 14 States from 25 percent to 50 percent are in that status. In 15 States from 10 percent to 25 percent of the cattle are under supervision, and in the remaining 16 States less than 10 percent are under supervision.

During the 4 years in which this work has been conducted, agglutination blood tests, including retests, have been applied to approximately 26,000,000 cattle, of which about 1,560,500 have been removed as reactors. Some work has been conducted in the field in connection with the vaccination of calves from four to eight months of age against Bang's disease, following a plan that has proved quite successful under controlled conditions at the experiment stations. The owners of infected herds have furnished the necessary cooperation, but the project is still considered to be in an experimental stage.

5. Indemnities for Cattle Slaughtered on Account of Bang's Disease.--Owners of cattle that react to the test for Bang's disease, and who comply with the regulations, receive a Federal payment in addition to the salvage derived from the slaughter of the cattle. The maximum Federal payment is \$25 for grade cattle and \$50 for registered purebred cattle, but the payment is further restricted in that it shall not exceed one-third of the difference between the appraised value and the salvage, and after May 1, 1939, the Federal payment shall not exceed the payment made by the cooperating agency for the same animal. In 14 States provision has been made for the payment of State indemnity to owners of cattle that react to this disease. This number will probably be increased to a considerable extent during the next 12 months. During the past fiscal year the average Federal payment was \$26.69. In addition to this, the owners received an average salvage of \$32.03. The average appraisal of cattle that reacted and were slaughtered was \$80.37. Nine percent of the reactors were registered purebred animals.

6. Experimentation in Diseases of Cattle.--This activity was started in 1936 with funds authorized by Section 37 of the Act of August 24, 1935. Two alleged remedies for Bang's disease which have been widely advertised have been subjected to critical tests. Researches in connection with calfhood vaccination against Bang's disease and the transmission of infectious abortion to cattle by swine have yielded considerable information thus far,

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but a large amount of work remains to be done in connection with these researches, as well as on other problems relating to Bang's disease, mastitis, anaplasmosis, warts, and nutritional deficiencies of cattle.

(f) ELIMINATION OF DISEASED CATTLE,  
DEPARTMENT OF AGRICULTURE.

This item, which was included under the miscellaneous section of the Appropriation Act during the fiscal years 1937 and 1938, was transferred in the 1939 Budget to follow "Eradicating tuberculosis and Bang's disease," Bureau of Animal Industry. No estimate was submitted under this head for 1939, and none is submitted for 1940, since the work of tuberculosis eradication, Bang's disease control, and special experimentation has been estimated for under the preceding item, "Eradicating tuberculosis and Bang's disease."

SUPPLEMENTAL FUNDS

| Projects  | Estimated obligations, 1940 | Estimated obligations, 1939 | Obligated, 1938 |
|---|-----------------------------|-----------------------------|-----------------|
| <u>Elimination of Diseased Cattle, Department of Agriculture:</u> |                             |                             |                 |
| Eradicating tuberculosis in cattle....                            | - - -                       | - - -                       | \$ 1,775,000    |
| Combating Bang's disease in cattle....                            | - - -                       | - - -                       | 11,653,062      |
| Experimentation in diseases of live-stock, etc. ....              | - - -                       | - - -                       | 129,538         |
| Total, Supplemental Funds .....                                   | - - -                       | - - -                       | 13,557,600      |

(g) ERADICATING CATTLE TICKS

Appropriation Act, 1939 ..... \$503,940  
Budget Estimate, 1940 ..... 503,940

PROJECT STATEMENT

| Project   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| Eradicating cattle ticks.....                                   | \$528,440 | \$503,940           | \$503,940           |
| Transfer from "Meat inspection", Bureau of Animal Industry..... | - 20,000  | - - -               | - - -               |
| Unobligated balance .....                                       | 5,500     | - - -               | - - -               |
| Total.....  | 513,940   | 503,940             | 503,940             |



[illegible][illegible]



## WORK UNDER THIS APPROPRIATION

This appropriation is used cooperatively for the payment of salaries and travel and office expenses of veterinarians and agents in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, and Texas, and the territory of Puerto Rico in the eradication of the cattle fever tick, which spreads splenic fever infection among cattle. As counties are freed of this tick they are released from Federal quarantine and their livestock may then be shipped to markets without restrictions. The States contribute large sums to this work. The work is conducted under State laws and regulations, Federal money being expended for supervision, thus insuring that all measures of eradication be so carried out as to warrant the release of areas from quarantine.

## (h) HOG CHOLERA CONTROL

Appropriation Act, 1939..... \$122,000  
 Budget Estimate, 1940..... 122,000

## PROJECT STATEMENT

| Projects                 | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--------------------------|-----------|---------------------|---------------------|
| Hog cholera control..... | \$118,867 | \$122,000           | \$122,000           |
| Unobligated balance..... | 8,325     | - - -               | - - -               |
| Total.....               | 127,192   | 122,000             | 122,000             |

## WORK UNDER THIS APPROPRIATION

Under this appropriation work is carried on in the control and eradication of hog cholera in the field by demonstrations, the formation of organizations, and other methods, either independently or in cooperation with farmers' organizations and State and county authorities. Meetings are held and demonstrations are made from time to time to gatherings of farmers and others interested in preventing losses. Outbreaks are investigated, swine diseases diagnosed, owners are instructed in methods to prevent losses, and local veterinary practitioners are assisted in the use of the preventive treatment and in diagnosing swine ailments. In sections of the South where no veterinary services are available, Bureau inspectors immunize swine in addition to their other duties, and in States where the laws and regulations permit laymen are trained to immunize swine.



## (i) INSPECTION AND QUARANTINE

Appropriation Act, 1939 ..... \$680,000  
 Budget Estimate, 1940 ..... 680,000

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| 1. Scabies eradication .....  | \$155,845 | \$162,280           | \$162,280           |
| 2. Control over interstate shipment of livestock for the purpose of preventing the spread of communicable diseases..... | 295,126   | 305,205             | 305,205             |
| 3. Enforcement of the 28-hour law ...   | 28,196    | 29,795              | 29,795              |
| 4. Determination by inspectors in the field of the existence of diseases.   | 28,919    | 20,930              | 20,930              |
| 5. Inspection and quarantine of import animals .....  | 90,699    | 84,920              | 84,920              |
| 6. Supervision over the importation of hides and other animal by-products, forage, etc. ....                            | 62,647    | 70,830              | 70,830              |
| 7. Inspection and testing of animals for export .....   | 5,728     | 6,040               | 6,040               |
| Unobligated balance .....   | 12,840    | - - -               | - - -               |
| Total .....   | 680,000   | 680,000             | 680,000             |

## WORK UNDER THIS APPROPRIATION

General.--Activities under this appropriation include eradication of scabies and dourine, in cooperation with the various States; the investigation of reported outbreaks of diseases among livestock to determine if they are communicable and, if so, assisting local authorities in their control and eradication; the application of diagnostic tests in the field and in the laboratory; control over interstate movements of livestock in order to prevent the dissemination of infections, which includes inspection at the principal market centers; administration of the 28-hour law to prevent cruelty to animals in interstate transportation; inspection and testing of livestock intended for export, to determine their freedom from disease, and the inspection of vessels on which they are to be transported; the inspection and quarantine of livestock offered for importation; control over import animal by-products, hay, and straw, to prevent the introduction or dissemination of the contagions of livestock diseases; and the administration, jointly with the Treasury De-

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partment, of Section 306 of the Tariff Act of 1930, prohibiting the importation of domestic ruminants or swine, or chilled or frozen fresh meats derived therefrom, from countries where foot-and-mouth disease or rinderpest exists.

1. Scabies Eradication.--The purpose of this project is the complete eradication of scabies or mange, a highly contagious skin disease of sheep and cattle which, if unchecked, causes great financial losses. Eradication work is carried on in cooperation with the States involved under written agreements with State authorities. It consists of inspecting all sheep or cattle, as the case may be, in areas where scabies exists or has existed recently and causing all animals found to be infected or exposed to be dipped under the supervision of Federal or State employees. Further inspections on the ranges or premises are then made in order that any infection that may have escaped may be promptly discovered and the animals properly treated. Quarantines of premises or specified areas where infection has been determined to exist are applied by State authorities in order to control movements of livestock until the required treatments have been accomplished, and, when necessary to prevent the spread of the disease to other States, Federal quarantine also is imposed. Inspections of cattle and sheep in the areas involved are continued for several seasons following the cleanup campaign to insure against the existence of obscure centers of infection.

2. Control over Interstate Shipment of Livestock for the Purpose of Preventing the Spread of Communicable Diseases.--The purpose of this project is to detect communicable diseases of livestock at public stockyards and to treat the animals and premises and the transporting vehicles in such a manner as to minimize the danger of spreading such diseases; to furnish information to livestock sanitary officials to assist them in eradicating the disease at point of origin; to supervise the application of tests used to detect communicable diseases in animals shipped from the stockyards to country points and to protect animals so shipped against such diseases. The discovery at public stockyards of shipments of livestock affected with communicable diseases is a very important factor in tracing infection back to its source. In a great many instances the discovery at public markets is the first knowledge gained of the existence of infectious disease in the district of origin. Notice is sent by Federal employees to State or local authorities, enabling them to take steps promptly to localize and eradicate outbreaks which would, otherwise, become widespread before information concerning them would reach the authorities. This project also covers the enforcement of the animal quarantine laws prohibiting the interstate movement of animals affected with or exposed to contagious, infectious, or communicable diseases.

3. Enforcement of the 28-Hour Law.--The 28-hour law is designed to lessen cruelty to animals while in the course of interstate transportation by preventing carriers from confining livestock for a period exceeding 28 consecutive hours without unloading in a humane manner into properly equipped pens for feed, water, and rest for at least five consecutive hours, except in cases where the confinement may be extended to 36 hours upon written request of the shipper.

4. Determination by Inspectors in the Field of the Existence of Diseases. Under this project the Bureau assists State authorities in investigating diseases





among livestock that appear to be communicable and in control and eradication work when such diseases are found to exist. Most prominent among these are dourine and encephalomyelitis of horses and anthrax. The procedure depends upon the particular disease found to exist. Inspectors in the field cooperate in making diagnoses, which in some cases includes drawing blood for forwarding to the laboratory for test, in arranging for the treatment or the destruction of animals affected, and in disseminating information among owners concerning measures to be taken. All reports of suspected cases of foot-and-mouth disease are carefully investigated.

5. Inspection and Quarantine of Import Animals.---The law requires that inspections be made of all livestock offered for importation. Accordingly, inspectors are assigned to stations along the international boundaries and on the seacoasts to inspect animals, examine accompanying certificates, and when necessary place the livestock in quarantine and maintain them under observation during specified periods. Animals in quarantine are subjected to certain diagnostic tests. Those found to be affected with or to have been exposed to any communicable disease are refused entry and are returned to the country of origin or destroyed. Vessels having on board live animals as sea stores, originating in countries where foot-and-mouth disease or rinderpest exists, are not permitted to dock until the animals have been slaughtered and the spaces occupied by them disinfected under supervision.

6. Supervision over the Importation of Hides and Other Animal By-products, Forage, etc.---Several serious diseases of livestock, such as foot-and-mouth disease, rinderpest, surra, and contagious pleuropneumonia, from which the United States is entirely free, exist in many countries with which we have active trade relations. In order to prevent the introduction of these diseases through the medium of imported materials, supervision and control are exercised over animal by-products, hay, straw, etc., offered for entry. All such products are held by the Customs Service for action by Bureau of Animal Industry inspectors, who indicate whether they may be released, or must be subjected to quarantine or destruction, or may proceed to approve establishments where they are disinfected in process of manufacture. A most important duty is to prevent the landing of any chilled or frozen fresh meats, whether sea stores or cargo, originating in countries where foot-and-mouth disease or rinderpest exists, which are prohibited entry under the tariff law. Measures are also taken to prevent the landing of garbage derived from such meats.

7. Inspection and Testing of Animals for Export.---The law provides that freedom from disease of domestic ruminants and swine intended for export must be established and that vessels on which they are to be transported must be so equipped as to insure the safe and humane handling of the animals. Inspectors in the field and at ports of embarkation make the necessary inspections, apply diagnostic tests, and take measures to comply with any additional requirements of the receiving countries. Space and facilities on the vessels are inspected and must be approved before embarkation is permitted.



## (j) MEAT INSPECTION

|                               |                  |
|-------------------------------|------------------|
| Appropriation Act, 1939 ..... | \$5,412,600      |
| Budget Estimate, 1940.....    | <u>5,433,000</u> |
| Increase .....                | <u>20,400</u>    |

## PROJECT STATEMENT

| Projects   | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase    |
|--|-------------|---------------------|---------------------|-------------|
| 1. Meat inspection operations at packing plants under the Federal Meat Inspection Service ...                              | \$5,208,925 | \$5,266,905         | \$5,287,305         | \$20,400(1) |
| 2. Determination of adulterations and other objectionable conditions in meat and meat food products by laboratory analysis | 90,933      | 88,600              | 88,600              | - - -       |
| 3. Inspection of imported meats and meat food products.....  | 31,950      | 29,775              | 29,775              | - - -       |
| 4. Chemical, pathological, and zoological investigations relating to meat inspection.....                                  | 26,707      | 27,320              | 27,320              | - - -       |
| Transfer to "Diseases of Animals", Bureau of Animal Industry .....   | 20,000      | - - -               | - - -               | - - -       |
| Transfer to "Eradicating cattle ticks", Bureau of Animal Industry .....  | 20,000      | - - -               | - - -               | - - -       |
| Unobligated balance.....   | 34,485      | - - -               | - - -               | - - -       |
| Total appropriation.....   | 5,433,000   | 5,412,600           | 5,433,000           | 20,400      |

## INCREASE

(1) An increase of \$20,400 is recommended in this item for 1940 to provide additional inspectors. There is an increasing trend in the meat-packing industry toward decentralization, especially of slaughtering operations. This trend results in an increased number of smaller units being placed near the sources of livestock supply. Since the number of inspectors cannot be reduced proportionately with the reduction in the hourly rate of slaughter at these smaller establishments, more inspectors are now required in proportion to the volume of slaughter and allied operations. For example, the full time of one employee is required at a small establishment to conduct post-mortem inspections of hogs at a rate of 60 or less per hour, whereas, in the fully equipped slaughtering department of a large establishment, 7 employees can, under usual conditions, inspect about 550 hogs per hour, representing a rate of about 80 hogs per hour, per inspector.



## CHANGE IN LANGUAGE

An addition to the code citations under this paragraph has been made so as to include the Act of June 29, 1933 (52 Stat. 1235-1236), amending the Meat Inspection Act of March 4, 1907, as amended and extended, with respect to its application to farmers, retail butchers, and retail dealers.

## WORK UNDER THIS APPROPRIATION

General.--The purpose of Federal meat inspection is to prevent, through the enforcement of the Meat Inspection Acts, the use in interstate or foreign commerce of meat and meat food products which are unsound, unhealthful, unwholesome, or otherwise unfit for use as human food. The principal meat inspection operations at meat packing establishments include ante-mortem and post-mortem inspections of cattle, sheep, swine, goats, and, to a limited degree, of horses; reinspection of meat and meat products during processing, preparation, and packing; and the supervision of marking and branding of products to insure truthful labeling. In addition, the service includes inspection under the Import Meat Act and Meat Inspection Act of imported meat and meat products; also laboratory examinations as assurance against adulterations or similarly objectionable conditions and to determine the character and importance of abnormal conditions in food animals encountered in ante-mortem examinations, by post-mortem inspections of their carcasses, and subsequent inspections of meats and meat food products derived therefrom.

1. Meat Inspection Operations at Packing Plants Under the Federal Meat Inspection Service.--The purpose of this project is to see that the laws and regulations governing meat inspection are properly observed. The inspection includes ante-mortem and post-mortem examinations of cattle, sheep, swine, goats, and horses to detect disease or conditions which might render any of the meat or organs unfit for food purposes; enforcement of sanitary requirements; reinspection of meat and products throughout the stages of the processing preparing, and packing operations and the inspection of ingredients, spices, and other substances added to meat and meat food products; custody, including supervision of the destruction for food purposes, of all condemned animals, carcasses, parts thereof, and meat food products; supervision of the labeling and marking of meat and meat food products; and investigation of the interstate transportation by common carrier and otherwise to ascertain compliance with the law as to eligibility of the product for interstate shipment and proper certification.

2. Determination of Adulterations and Other Objectionable Conditions in Meat and Meat Food Products by Laboratory Analysis.--Under this project laboratory analyses are made to ascertain whether meat and meat food products which are prepared at official establishments or at plants operated under certificates of exemption and imported meat and meat food products are adulterated or contain prohibited or otherwise objectionable materials and whether water and ice used in the preparation of meat and meat food products are clean and potable; to determine the fitness of curing agents, ingredients, spices, and other substances intended for use in preparing meat and meat food products; and to ascertain the efficacy of materials used for denaturing of inedible and condemned articles.





3. Inspection of Imported Meats and Meat Food Products.---The purpose of this project is to see that only meat and meat food products are accepted for importation which have been properly certified from abroad, are sound, healthful, wholesome, and otherwise fit for use as human food, and are truthfully labeled.

4. Chemical, Pathological, and Zoological Investigations Relating to Meat Inspection.---The principal purpose of this project is to conduct research and investigations for the scientific determination as to the character and importance of abnormal conditions encountered in ante-mortem, post-mortem, and subsequent inspections of food animals and meat and meat food products.

(k) VIRUS-SERUM-TOXIN ACT

Appropriation Act, 1939 ..... \$218,712  
 Budget Estimate, 1940 ..... 218,712

PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| Control of manufacture, importation,<br>and shipment of viruses, serums,<br>toxins, etc. .... | \$213,992 | \$218,712           | \$218,712           |
| Unobligated balance.....  | 4,720     | - - -               | - - -               |
| Total .....   | 218,712   | 218,712             | 218,712             |

WORK UNDER THIS APPROPRIATION

This item provides for the enforcement of the provisions of the Virus-Serum-Toxin Act, approved March 4, 1913, regulating the preparation, sale, barter, exchange, or shipment of virus, serum, toxin, or analogous products produced in the United States and the importation of such products intended for use in the treatment of domestic animals. Careful attention is given to sanitation, labeling, and the testing of the finished products for purity and potency.

Establishments desiring to produce veterinary biologics for interstate shipment are required by law to hold a United States veterinary license. The holders of such licenses must at all times comply with the regulations of the Secretary of Agriculture as to personnel, construction of plant, methods of production, and the like. Regulations have also been issued by the Secretary of Agriculture governing the importation of veterinary biologics from foreign countries. Bureau inspectors directly supervise all operations performed by licensed establishments in the production of anti-hog-cholera serum and hog-cholera virus. Establishments producing other biologics are inspected periodically.



## (1) MARKETING AGREEMENTS WITH RESPECT TO HOG-CHOLERA VIRUS AND SERUM

Appropriation Act, 1939 ..... \$30,000(a)  
 Budget Estimate, 1940 ..... 30,000(a)

(a) Transferred and payable from the unobligated balance of the appropriation provided by Section 12 (a), Title I, of the Agricultural Adjustment Act of May 12, 1933.

## PROJECT STATEMENT

| Projects  | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-------------|---------------------|---------------------|
| Marketing agreements with respect to<br>hog cholera virus and serum.....                              | (a)\$17,779 | \$30,000            | \$30,000            |
| Received by transfer from "Salaries<br>and Expenses, Agricultural Adjustment<br>Administration" ..... | - 17,779    | -30,000             | -30,000             |
| Total .....   | - - -       | - - -               | - - -               |

(a) Unobligated portion of allotment (\$12,221 - out of total allotment of \$30,000) returned to "Salaries and Expenses," Agricultural Adjustment Administration.

## WORK UNDER THIS APPROPRIATION

This item provides funds for the enforcement of sections 56 to 60, inclusive, of the Act approved August 24, 1935 (7 U.S.C. 851-855), entitled "An Act to amend the Agricultural Adjustment Act and for other purposes." Such marketing agreements are intended to insure the maintenance of an adequate supply of anti-hog-cholera serum and hog-cholera-virus for hog producers and to aid in making other improvements in trade conditions. The Department exercises supervision over agencies that may be established under the provisions of such agreements, receives reports of their activities, and reviews their acts, orders, etc.

## (m) PACKERS AND STOCKYARDS ACT

(Entire item transferred to and set up as a subappropriation under "Salaries and Expenses", Agricultural Marketing Service, in Estimates for 1940).

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## (n) IN ALL, SALARIES AND EXPENSES

Change in Language

A new heading covering total for "Salaries and Expenses", Bureau of Animal Industry, has been inserted at this point in the Estimates. This includes the words "to be accounted for as one fund". For explanation of this language see general note in these Justifications under Office of Experiment Stations, page 54 .

(o) ERADICATION OF FOOT-AND-MOUTH AND OTHER  
CONTAGIOUS DISEASES OF ANIMALS

This item continues the availability of the unexpended balance (\$1,317,650) of the appropriation of \$3,500,000 made in 1924 to be used in case of an emergency arising from an outbreak of foot-and-mouth or other contagious diseases of animals. It provides also that \$5,000 of this balance may, if needed, be used for the control of European fowl pest and similar diseases in poultry. No expenditures are contemplated during the fiscal year 1939 unless an emergency arises, but the availability of this fund is absolutely essential to insure protection of the American livestock industry should outbreaks occur.

## SUPPLEMENTAL FUNDS

(Complete Bureau Statement)

(1) Direct Allotments

| Projects  | Estimated<br>obligations,<br>1940 | Estimated<br>obligations,<br>1939 | Obligated,<br>1938 |
|---|-----------------------------------|-----------------------------------|--------------------|
| <u>Special Research Fund, Department of<br/>Agriculture:</u>  |                                   |                                   |                    |
| Special research projects.....  | \$69,300                          | \$69,600                          | \$54,638           |
| Special research laboratories in<br>major agricultural regions.....   | 275,000                           | 265,200                           | 291,200            |
| Total, Special Research Funds...  | 344,300                           | 334,800                           | 345,838            |
| <u>Agricultural Adjustment Administration<br/>(Salaries and Expenses): Marketing<br/>agreements, hog-cholera virus and<br/>serum.....</u> | 30,000                            | 30,000                            | 17,779             |





SUPPLEMENTAL FUNDS - Continued  
(Complete Bureau Statement)

(1) Direct Allotments - Continued

| Projects  | Estimated obligations,<br>1940 | Estimated obligations,<br>1939 | Obligated,<br>1938 |
|---|--------------------------------|--------------------------------|--------------------|
| <u>Elimination of Diseased Cattle, Department of Agriculture:</u>   |                                |                                |                    |
| Eradicating tuberculosis in cattle..  | - - -                          | - - -                          | 1,775,000          |
| Combating Bang's Disease in cattle..  | - - -                          | - - -                          | 11,653,062         |
| Experimentation in diseases of livestock, etc.....  | - - -                          | - - -                          | 129,538            |
| Total, Elimination of Diseased Cattle funds .....   | - - -                          | - - -                          | 13,557,600         |
| <u>Public Works Allotments (National Industrial Recovery Act):</u> For completion of physical improvements at Beltsville, Md., begun in 1934..... | - - -                          | - - -                          | 285                |
| <u>Public Works Administration (Emergency Appropriation Act, 1935):</u> For physical improvements at Beltsville, Md.:                             |                                |                                |                    |
| Completion of poultry fattening building.....   | - - -                          | - - -                          | 397                |
| Nutrition laboratory.....   | - - -                          | - - -                          | 2,025              |
| General completion of entire poultry plant, including side-walks, painting, road drainage, storage shed, and hard surfacing roads.....            | - - -                          | - - -                          | 2,001              |
| Total, P.W.A. (Emergency Appropriation Act, 1935).....  | - - -                          | - - -                          | 4,423              |
| Total, Supplemental Funds (Direct Allotments).....  | \$374,300                      | \$364,800                      | 13,925,925         |

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2. Indirect Allotments

(Financed through other Government agencies)

| Projects  | Obligated,<br>1938 | Estimated<br>obligations,<br>1939 |
|---|--------------------|-----------------------------------|
| <u>Emergency Conservation Work</u> (authorized by Acts of March 31, 1933, and April 8, 1935; allotment through War Department): Work of Civilian Conservation Corps in clearing land, building roads, and constructing fences, drainage ditches, pipe line, etc., at livestock experiment stations at Beltsville, Md., and Brooksville, Fla. .... | \$133,034          | - - -                             |

## PASSENGER-CARRYING VEHICLES

The authorization for the purchase of passenger-carrying vehicles for the Bureau of Animal Industry contemplates an increase of \$78,800 (\$66,150 in 1939 for 130 cars; \$144,950 estimated for 1940 for 281 cars) for this purpose. This \$144,950 for 1940 will permit the Bureau to purchase 37 additional passenger vehicles (4 of which will replace trucks) at a cost of \$21,900, and to replace 244 old passenger vehicles at a cost of \$123,050.

Of these 37 additional cars, 2 are for use at our experimental farms in rural sections where no public transportation in any form is available, and 2 are for travel to abattoirs and meat-packing plants in connection with meat-inspection work. These four cars are badly needed in order to utilize the services of employees to the fullest extent. Much time is now lost in getting to the various sections of our experimental farms at Beltsville, Md., and Middlebury, Vt., due to lack of suitable transportation facilities; and the various packing houses in Fort Worth, Texas, and Chicago, Ill., are so situated in outlying sections as to make it impracticable for supervising personnel to use public transportation in their inspectional work. Of the 33 remaining additional cars, 28 are for use in travel from farm to farm by veterinarians engaged, in cooperation with the various States, in the control and eradication of tuberculosis and Bang's disease; 4 cars (replacing trucks) are required for the eradication of cattle ticks in the South and 1 for the control of hog cholera. At the present time personally-owned cars are being used at 5 cents a mile, as public transportation is either inadequate or not available in the sections in which travel is performed.

Of the 244 cars to be replaced, 150 were purchased with special funds provided by the Jones-Connally Act and Section 37 of the Act of August 24, 1935, and will be replaced at a cost of \$75,000. Starting with the fiscal year 1939 these special funds have been merged with the regular appropriations of the Bureau of Animal Industry. Hence, the increase for 1940 over 1939, if



cost of replacement of cars purchased with special funds is excluded, is \$3,800. The appropriation for 1939 does not include any funds for the replacement of passenger cars purchased with special funds.

It is not practicable for the Bureau to attempt to carry on economically and efficiently its varied activities in the field solely by the use of public transportation. When Government-owned cars are not available it is necessary to authorize employees to operate their personally-owned cars, for which they receive reimbursement. The Bureau is now operating 811 passenger-carrying vehicles in the field and has found their use to be considerably less expensive than the practice of reimbursing employees for the operation of their personally-owned vehicles. It has been found that in almost every section of the country Government-owned cars can be operated (purchase price, plus operation charges, less trade-in allowance) for approximately 3 cents a mile. All the cars to be replaced are of such an age that they no longer can be operated economically, the average mileage being over 40,000, with some as high as 60,000. It has been the experience of the Bureau that the elements of age, mileage, and type of usage must all be taken into consideration when replacement of cars is considered, in order to reduce the expense of operating Government-owned vehicles. The funds requested in 1940 will permit the replacement of less than one-third of the Bureau's cars. Most of these passenger-carrying vehicles are in use daily on rural inspectional work and many of them average 18,000 miles a year. It therefore appears necessary, if mileage costs are to be kept at the lowest point possible, to replace all vehicles, on an average, after they have been in use between three and four years.





BUREAU OF DAIRY INDUSTRY

## (a) GENERAL ADMINISTRATIVE EXPENSES

Appropriation Act, 1939..... \$70,495  
 Transferred in 1940 estimates from  
   "Dairy Investigations", Bureau of  
   Dairy Industry, which is reduced  
   accordingly (to provide additional  
   personnel and facilities)..... + 5,005 (a)  
 Total available, 1939..... 75,500  
 Budget Estimate, 1940..... 75,500

## PROJECT STATEMENT

| Project   | 1938       | 1939<br>:(Estimated) | 1940<br>:(Estimated) |
|---|------------|----------------------|----------------------|
| General administration and business<br>service..... | \$75,440   | \$75,500             | \$75,500             |
| Unobligated balance.....                            | 60         | - -                  | - -                  |
| Total appropriation.....                            | (b) 75,500 | (b) 75,500           | 75,500               |

- (a) The transfer of \$5,005 includes (1) \$1,165 for the payment of such charges as telephone and telegraph service and for photographic work for the entire Bureau. Under present conditions these charges are paid prorata from the various project allotments under the appropriation "Dairy Investigations." This procedure involves much additional book-keeping in the office of accounts and is unsatisfactory because of the practical impossibility of accurately prorating the charges; (2) \$3,840 to provide additional clerical and other assistance in the Accounts, Personnel, and Property Sections of the Division of Administration. The work of these sections has so materially increased that it cannot be efficiently and effectively handled by the existing personnel. Under present conditions peak periods are met by detailing untrained personnel from other divisions of the Bureau. This procedure not only interferes with the work of the scientific divisions from which the personnel is detailed, but, because the detailed personnel lack experience in administrative duties and procedures, it is more or less unsatisfactory.
- (b) Includes for 1938 and 1939 \$5,005 as set forth in first table above (transferred in Estimates for 1940 from "Dairy Investigations").

## WORK UNDER THIS APPROPRIATION

The work conducted under this appropriation includes the direction of research, regulatory, and service activities of the Bureau of Dairy Industry, the administration of the business activities, general supervision of personnel, administrative review of publications and other material for disseminating the results of research work, and compilation of bibliographies of dairy literature and related library work.



## (b) DAIRY INVESTIGATIONS

|  |               |
|--|---------------|
| Appropriation Act, 1939.....   | \$646,910     |
| Transferred in 1940 Estimates to<br>"General Administrative Expenses,"<br>Bureau of Dairy Industry (to provide<br>additional personnel and facilities in<br>administrative offices)..... | - 5,005       |
| Total available, 1939.....   | 641,905       |
| Budget Estimate, 1940.....   | 675,905       |
| Increase.....  | <u>34,000</u> |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase       |
|---|-----------|---------------------|---------------------|----------------|
| 1. Investigations of milk and<br>butterfat production of<br>dairy cows:   |           |                     |                     |                |
| (a) Investigations of in-<br>heritance of milk and<br>butterfat production...   | \$164,772 | \$174,928           | \$174,928           | ---            |
| (b) Investigations of in-<br>fluence of feeding and<br>management on level and<br>cost of milk production<br>and growth.....  | 69,105    | 71,111              | 71,111              | ---            |
| (c) Investigations of re-<br>lation of conformation<br>to producing ability...  | 13,635    | 15,042              | 15,042              | ---            |
| (d) Investigations of the<br>nutritional and other<br>physiological factors<br>affecting the useful-<br>ness of dairy cattle...   | 79,547    | 79,673              | 83,673              | +\$4,000 (1-a) |
| (e) Studies of dairy-<br>herd-improvement as-<br>sociation records to<br>determine the effect of<br>the application of<br>breeding and feeding<br>practices on level and<br>economy of production.. | 103,653   | 94,961              | 124,961             | +30,000 (1-b)  |
| Total, Investigations of milk<br>and butterfat production<br>of dairy cows.....   | 430,712   | 435,715             | 469,715             | +34,000 (1)    |
| 2. Market-milk investigations   |           |                     |                     |                |
| (a) Dairy sanitation<br>research.....   | 11,097    | 11,800              | 11,800              | ---            |
| (b) Milk-plant management<br>investigations.....  | 7,398     | 7,870               | 7,870               | ---            |
| (c) Milk quality improve-<br>ment investigations.....   | 11,500    | 12,030              | 12,030              | ---            |
| Total, Market-milk<br>investigations.....   | 29,995    | 31,700              | 31,700              | ---            |



## PROJECT STATEMENT -- Continued

| Projects  | 1938       | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase |
|---|------------|---------------------|---------------------|----------|
| 3. Investigations of the utilization of milk in the manufacture of milk products:     |            |                     |                     |          |
| (a) Basic investigations of the bacteriology and chemistry of milk.....               | \$15,906   | \$16,350            | \$16,350            | ---      |
| (b) General investigations of ice cream manufacture.                                  | 16,147     | 18,165              | 18,165              | ---      |
| (c) General investigations of the manufacture of butter and by-products....           | 41,530     | 46,590              | 46,590              | ---      |
| (d) Condensed, evaporated and dried milk investigations.....                          | 17,855     | 22,450              | 22,450              | ---      |
| (e) General investigations of cheese manufacture,...                                  | 32,936     | 33,780              | 33,780              | ---      |
| (f) State and industry relations for milk products manufacture.....                   | 30,914     | 30,155              | 30,155              | ---      |
| (g) Inspection of renovated butter factories (regulatory).....                        | 7,226      | 7,000               | 7,000               | ---      |
| Total, Investigations of utilization of milk in the manufacture of milk products..... | 162,514    | 174,490             | 174,490             | ---      |
| Total obligated.....  | 623,221    | 641,905             | 675,905             | \$34,000 |
| Unobligated balance.....  | 4,973      | ---                 | ---                 | ---      |
| Total appropriation.....  | (a)628,194 | (a)641,905          | 675,905             | 34,000   |

(a) Amounts for 1938 and 1939 exclude \$5,005, as set forth in first table above (transferred in Estimates for 1940 to "General Administrative Expenses").

## INCREASE

(1) The increase of \$34,000 in this item for 1940 consists of:

(a) An increase of \$4,000 for investigations of the nutritional and other physiological factors affecting the usefulness of dairy cattle. The capacity of this project to produce effective results is largely limited by the number of experimental animals used. Unless additional funds are provided, it will be necessary to dispose of a considerable part of the natural increase in the herd, with a consequent restriction of the scope of the work being conducted. Experiments in nutrition and in the physiology of reproduction of dairy cattle must of





necessity be continued for long periods, and results are measured to a large extent through the offspring of the experimental animals. To dispose of any considerable number of the offspring of the experimental animals will result in the loss of valuable experimental data. The increase recommended will be utilized for the purchase of feeds and other supplies and equipment.

(b) An increase of \$30,000 for studies of dairy-herd-improvement association records to determine the effect of the application of breeding and feeding practices on the level and economy of production. The dairy-herd-improvement association program, with its nationwide sire-proving project, is now larger and broader in scope than ever before, and for the first time is being conducted in every State and in Hawaii and Puerto Rico. Five hundred and fifty-eight thousand cows are being tested. This number exceeds the previous peak year of 1931 when 510,000 cows were on test. Those cows are in the herds of approximately 24,000 dairymen, all of whom are members of local dairy-herd-improvement associations. These dairymen pay a total of more than one million dollars each year in support of their local associations. During the last 10 years the association members have so improved the producing efficiency of their dairy herds that the average production of their cows is now approximately 28 pounds of butter fat more than it was a decade ago. This production advance has increased the income of the association members approximately \$8,000,000 a year.

The nationwide sire-proving program, which is conducted as a part of the dairy-herd-improvement association program, is the broadest and most comprehensive dairy-cattle breeding program ever undertaken in this or any other country. Under this program complete data are obtained on approximately 24,000 dairy herds. These data are analyzed to show the genetic make-up of each herd for the purpose of identifying those animals and families of animals which possess the hereditary ability to transmit high-milk and butterfat producing ability to their offspring. Largely through the extensive use of proved sires, it is the purpose of the program to disseminate the influence of these superior herds in order that the butterfat production of all dairy cows in the country will approach or equal the average production of cows in dairy-herd-improvement associations. At present the average production of all cows in the United States is 170 pounds of butterfat, whereas the average of cows in dairy-herd-improvement associations is 320 pounds. Data are being obtained on every sire used in every association herd, and large numbers of superior sires are being identified annually.

The program in full operation will, for the first time, afford all dairymen an opportunity to obtain the services of sires known to have the ability to transmit an inheritance for high-milk and butterfat production. The producing efficiency of dairy herds generally may then be consistently and systematically improved. This will reduce losses which dairymen now sustain in raising animals to maturity which when tested are found to be poor producers.

The program is being adopted by dairymen in all sections of the country. As possibilities of the program have become generally recognized, the membership in local associations has increased more than 8,000, with the result that more than 150,000 additional cows have been placed on test during the past 2 years.

The increased funds for this project are to provide additional facilities for properly handling the records being received from the associations in the States. At present more than 1,200 records are received daily. When all as-



sociation testers are fully trained by the States to conduct the project in every association and the program is in complete operation, at least 1,700 production records and 600 identification records will be received daily. These records must be checked, recorded, tabulated, analyzed, and published. Present facilities and personnel are inadequate to handle this volume of work. The most urgent need at present is for equipment, and, unless additional funds are provided for the purpose, large numbers of records cannot be filed and the work of the entire project will be seriously jeopardized. It is essential that approximately \$18,500 be expended for the purchase of equipment during the fiscal year 1940. The various State agricultural colleges and more than 1,100 associations, consisting of approximately 24,000 dairymen, are cooperating with the Bureau of Dairy Industry in conducting this project. In the field the project has made extraordinary progress and the present request for additional funds is to enable the Bureau to satisfactorily perform its part of this broad national dairy-herd-improvement program.

#### WORK UNDER THIS APPROPRIATION

General.--The work conducted under this appropriation by the Bureau of Dairy Industry embraces scientific research and experimentation in the various problems of milk production and utilization, including studies in the breeding, feeding, and management of dairy cattle; nutritional and physiological factors affecting milk secretion and the health of animals, with special reference to reproduction; investigations of the efficiency and economy of milk production through the operation of dairy-herd-improvement associations; studies of problems relating to the sanitary production, transportation, processing, and distribution of market milk and cream; basic investigations of the bacteriology and chemistry of milk; investigations of the effective utilization of milk byproducts to develop new uses for such byproducts; and studies of methods of manufacturing milk products and byproducts, including improvement in existing methods of manufacture. The Bureau is also charged with the enforcement of the law relating to the manufacture of renovated or process butter and the sanitary inspection of renovated-butter factories.

1. Investigations of Milk and Butterfat Production of Dairy Cows.--Under this project investigations are conducted in the breeding, feeding, and management of dairy cattle, including investigations of the nutritional and physiological factors affecting milk secretion and reproduction. The investigations are conducted by the Bureau of Dairy Industry through its Divisions of Dairy Cattle Breeding, Feeding, and Management; Dairy-Herd-Improvement Investigations; and Nutrition and Physiology under the following projects:

(a) Investigations of Inheritance of Milk and Butterfat Production.--

These investigations have for their object a determination of the comparative effects of different methods of breeding in fixing an inheritance for high and uniform levels of producing ability in dairy cows. Among these methods of breeding is a test of the possibilities of breeding strains of cattle which will be pure in their inheritance for high levels of production, as a result of the continued use of sires that have demonstrated they possess the hereditary factors that enable them to transmit high levels of production to all of their offspring. The need for investigational work in the breeding of animals for consistently high production is emphasized by the fact that of all cows in dairy-herd-improvement associations only about one-third of them produce enough to be profitable to





their owners. The other two-thirds either show no profit at all or are being kept at a loss. Data from 25 States show that about 38.6 percent of the cows discarded were eliminated because of low production. Since less than 2 percent of the total cow population of the country are in dairy-herd-improvement associations, and these, together with cows being tested through the breed associations, are considerably higher producers, on the average, than the average dairy cow, it appears that much less than 38.6 percent of the total dairy-cow population produce enough to be profitable to their owners.

A recent germ-plasm survey, the results of which were published in the 1936 Yearbook of the Department of Agriculture, showed that in approximately 1,100 herds representative of the better class of dairy cattle in the country, no improvement in producing ability, on the average, has been achieved. In 708 of these herds, 4,309 sires had been used, and of those sires on which sufficient data were available to evaluate their transmitting ability only about one-half had been able to increase the production of their daughters over that of the dams of the daughters, though these sires had been selected by men who were perhaps the best informed in such matters in the industry.

Eighty-two Jersey cows sired by bulls of proven transmitting ability, bred at the Beltsville Station and tested under uniform conditions, have made an average mature yield of 657 pounds of butterfat. Ninety-one Holstein cows have been sired at this station by sires of known transmitting ability, and their average production on a mature basis was 689 pounds of butterfat. Only 16 of the 91 cows made records of less than 600 pounds of butterfat. The lowest producer of the 173 cows of both breeds had a record of 253 pounds of butterfat, and this low production is believed to be due to extensive abscesses which were found on post-mortem examination. A number of cows that did not produce up to expectations were found to have abnormal pituitaries.

The above results appear to indicate that the system of using only those sires that are selected on the basis of their ability to sire daughters which are uniformly higher producers than their dams is successful in fixing an inheritance in which the factors for high-producing ability predominate. The only apparent weakness of the superior proved-sire system of breeding is the scarcity of superior proved sires. Theoretically, however, once the inheritance for the factors determining the level of production is purified in a given herd or strain, the male offspring should possess the inheritance and should transmit it to its offspring.

Dairy farmers will continue to carry the burden of a large percentage of cows that do not possess the inherent ability to produce a sufficient amount of milk and butterfat to make them profitable until such time as breeding experiments, such as those being conducted by the Bureau of Dairy Industry, point the way to breeding practices that will be free of the factors responsible for low production.

Artificial insemination as a means of expanding the use of valuable breeding sires is continuing to receive close study. Many inquiries are being received for information on the technique of artificial insemination. Associations are being organized in many States for impregnating cows in small herds by artificial insemination. The direct transfer of semen to animals in the same or nearby herds has about the same efficiency as natural matings, but the shipment of semen to





distant points has not been equally successful. Further investigational work is greatly needed on this and other phases of artificial insemination.

(b) Investigations of Influence of Feeding and Management on Level and Cost of Milk Production and Growth.--The object of this project is to determine the influence of various feedstuffs on the growth and milk production of dairy cattle; the comparative values of various roughages when cut at different stages of maturity and when made into hay or silage; the effect of fertilization and rotational grazing on the value of pastures for milk production; and the effect of different methods of handling, milking, feeding, exercising, and pasturing on the economy and level of milk production. Artificial drying of roughages is being tried out experimentally. The determination of feeding methods and rations for calves to reduce mortality and assure growth during the early months of life is also an important phase of the work.

Data collected in these experiments show that nutrients for cows can be produced in perennial roughage crops at approximately half the cost of producing nutrients in grains. Twenty-three Holstein-Friesian cows on rations consisting entirely of alfalfa hay, corn silage, and pasture have completed 29 lactation periods with an average yield at maturity of 11,847 pounds of milk and 421 pounds of butterfat. Fifteen cows on rations consisting entirely of alfalfa hay have completed 24 lactation periods with an average yield of 11,125 pounds of milk and 390 pounds of butterfat on a mature basis. Four cows on rations consisting entirely of hay made from immature pasture grass herbage have completed five lactation periods with an average of 11,203 pounds of milk and 400 pounds of butterfat. Because of the lower cost of producing nutrients in the form of roughages, the lower production of cows on rations consisting largely of roughage may be as profitable as the higher production secured by heavy grain feeding.

Experiments indicate that any kind of hay crop in the green form can be made into silage successfully with little loss of nutrients by partial wilting before ensiling (when necessary), fine chopping, and thorough packing in a tight silo. The addition of acids or molasses to preserve the silage is laborious, expensive, and unnecessary. Alfalfa silage has been found equal to alfalfa hay in palatability and in efficiency for the production of milk. Various grasses, small grain crops, and mixtures of grasses and legumes have all been made into good silage. Investigations indicate that crops dry enough to store in the barn may be put in the silo instead. The silo is proving useful in a number of ways. It saves hay crops that would be damaged or lost because of rains at harvesting time, preserves for feed the crops which have been grown during the winter to prevent soil erosion, and eliminates the hazard of fire.

Investigations with various types of silos show that the farmer with little or no capital can make acceptable silage from the hay crops in pits, dirt-covered stacks and in temporary silos constructed of snow fence and special paper.

(c) Investigations of Relation of Conformation to Producing Ability.--Under this project studies are made for the purpose of determining the relationship, if any, between conformation and anatomy of dairy cows to their producing ability, and to establish, if possible, a scientific basis for judging and selecting dairy cattle from outward appearances.



It has been found that the first lactation production of a group of 64 Holsteins is closely related to the degree of development of secretory tissue in the udder as evaluated by palpation at six months of age. Average production increased steadily by groups from 8,856 pounds of milk for animals that had a retarded development as calves to 14,317 pounds for animals that had an advanced development as calves. This finding gives promise of making it possible to identify calves that have a potential capacity for low production and thus to eliminate the heavy losses resulting from raising several million dairy heifers to producing age only to find they are unprofitable producers.

The attempt to establish a scientific basis for judging the producing ability of dairy cattle by their conformation is being made by correlating the measurements of the external development of cows of known producing ability with the measurements and weights of their internal organs. This work is being carried on cooperatively with sixteen State experiment stations.

(d) Investigations of the Nutritional and Other Physiological Factors Affecting the Usefulness of Dairy Cattle.--The investigations being conducted under this project contemplate the determination of the essential elements of a ration that will maintain a cow in good health and optimum milk production. It is evident that in many cases the milk yield is limited and the nutritive value of the milk lowered by specific factors that are lacking in rations which by the usual standards would be considered ample, and that continued subsistence on rations deficient in some respect may result in temporary or permanent failure of the reproductive function or failure to resist infection, thus resulting in large economic losses.

The researches undertaken under this project include among others (1) a critical study of the energy required in the rations of dairy cattle and of the methods of determining the energy value of cattle feeds; (2) the effect of different levels of protein in the diet of a cow upon the yield and composition of her milk, including a study of the metabolism of various protein constituents in relation to milk secretion; (3) the calcium and phosphorus metabolism of dairy cattle, including a study of the effect on growth, health, production, and reproduction of using mineral supplements and roughages of various kinds and quality (4) an investigation of vitamin A in the nutrition of dairy cattle, including a study of the reproduction of the cow on low-quality hays, the amounts of vitamin A required in dairy rations for growth and for normal reproduction, the effect of various levels of vitamin A in the diet upon the nutritive value of the milk, the rearing of calves on milks that are low in vitamin A content and on skim milk, the vitamin value of various farm feeds, and methods of supplementing vitamin-A-deficient feeds for growth, for reproduction, and in order to produce milk rich in this nutritive essential; (5) a study of the effect of partially deficient rations on fecundity in cattle and small animals, in succeeding generations, in order to get at the nature of some of the dietary factors causing irregularities or complete failure in reproduction with dairy cattle; and (6) an investigation into the changes in milk coincident with the onset of mastitis and the factors causing these changes.

Investigations on the physiology of milk secretion, including a study of the relation between the diet, the composition of the blood, and the composition and secretion of milk, together with a study of the endocrine factors affecting milk secretion, are also conducted under this project.





(e) Studies of Dairy-Herd-Improvement Association Records to Determine the Effect of the Application of Breeding and Feeding Practices on Level and Economy of Production.--There are more than 1,100 dairy-herd-improvement associations operating in the 48 States, Puerto Rico, and Hawaii testing more than 558,000 cows in approximately 24,000 dairy herds. In 1937 these cows produced an average of 320 pounds of butterfat. There are in the United States approximately 25,000,000 cows kept for milking purposes. The latest available data show that these cows have an average butterfat production of only 170 pounds per year, or approximately one-half that of the cows on test in dairy-herd-improvement associations. Feed and production records obtained in all herds on test in dairy-herd-improvement associations are analyzed to show, under actual farm conditions, the most efficient and profitable feeding and herd-management practices, in order that those practices may be recommended for adoption by dairymen generally.

Production, value of product, feed cost, and income over feed cost are calculated for each cow on test. With this detailed information the dairyman may intelligently discard low-producing, unprofitable cows from his herd and adopt better feeding practices. The feed and production records are summarized and analyzed by herds, by associations, by States, and for the United States. These analyses are made available to the State colleges to be used by them in connection with their extension programs to promote the adoption of improved practices.

Improving dairy herds through culling, feeding, and management has definite limitations, as a herd cannot be made to produce more than its inherent or natural capacity to produce. Genuine herd improvement, therefore, must come through breeding. Dairymen generally, however, are having discouraging and costly experiences in improving the breeding of their dairy herds. A dairyman may be successful in selecting a bull that will improve his herd, but experience shows that two times out of three he will, if left to his own initiative, select a sire that will lower the average production of his herd.

To cope with this situation and to assist dairymen in selecting bulls that should improve their herds, the production records obtained in dairy-herd-improvement associations are being used as the basis of a nationwide sire-proving program, more comprehensive in scope than any dairy cattle breeding program ever conducted in this or any other country. In a sense, the 558,000 cows on test serve as a breeding herd to supply improved breeding stock for our national dairy herd of 25,000,000 cows. To accomplish this task breeding stock, particularly, sires, must be made available in great numbers. To place this far-reaching program into operation it is necessary to identify all animals on test. Approximately 80 percent of the animals in association herds are grades and in the past have not been satisfactorily identified. A nationwide eartag identification plan was developed through which every grade or nonregistered animal is given a special eartag number. With complete identification records of grade as well as purebred animals, blood and family lines may be traced and evaluated in all herds in dairy-herd-improvement associations. Complete identification and production data for all the 558,000 cows in association herds are assembled in a permanent record system established in the Bureau of Dairy Industry. The records are filed so as to show every dairy cow family represented in the 24,000 association herds. The data are used to indicate the breeding value of every sire used in every association herd. As the work progresses from year to year, proved sires and the sons of proved sires, by the thousands, will be located and made available. There are





approximately 1,500 counties in the United States that may be regarded as dairy counties. Eventually it will be possible to have in each county and community several sires on which data are available to indicate their breeding value. When this situation prevails the demand for improved breeding stock may be satisfactorily supplied.

To disseminate all available information on dairy sires, a proved-sire record for each sire is issued to the owner and to dairy leaders in the States. The genetic make-up of sires is indicated so that inferior ones may be discarded while superior ones may be retained for more extensive use. Complete genetic analyses are made of association herds to indicate those animals and families of dairy cattle that seem to possess the ability to transmit to their offspring an inheritance for high-producing capacity. The influence of the superior animals and families may then be perpetuated and disseminated throughout the dairy-cow population. At six-month intervals the records of all proved sires are published for general distribution in order that information on proved dairy sires may be available to dairymen and dairy leaders generally. A bull association program is sponsored and directed by the Bureau of Dairy Industry to demonstrate the advantages of an organized dairy-cattle breeding program for a community and the economy of cooperative ownership and use of herd sires. Bull associations provide the facilities for long and extensive use of good proved sires. Through bull associations outstanding proved sires, regardless of their age, are usually more completely utilized and their influence more widely disseminated than if they are owned by individual dairymen.

Often a dairyman loses money on his farm business as a whole even though he has a high-producing herd. In such cases financial records to supplement the feed and production records will show the weak and strong points in the organization and operation of the farm. It may be that the income from the dairy herd is being wasted by uneconomical feeding and care, paying extravagant prices for new stock and having only cull stock to sell, inefficient crop production methods, high expenses for buildings and equipment, etc. Recognizing that efficiency in farm organization and operation is necessary to obtain the greatest net farm income, complete financial records are now being obtained on many farms in dairy-herd-improvement associations. This phase of the project is conducted in cooperation with the Bureau of Agricultural Economics and the analysis of the records obtained is being done under the joint supervision of the two bureaus. The results of the analyses of farm management and dairy production data will be returned to the State colleges for use in promoting more profitable practices.

2. Market-Milk Investigations.--Under this project are conducted investigations in sanitary and economical methods of producing, transporting, processing, and distributing market milk and cream to be utilized in fluid form. These investigations include the production and handling of market milk under experimental as well as practical conditions on dairy farms and a study of community milk improvement through milk-control and extension agencies on the area plan. Investigations of the construction, equipment, and efficient operation of milk plants for the processing and preparation for the market of fluid milk and cream are also conducted, as are investigations in the laboratory and at commercial dairy farms and plants to ascertain factors affecting the marketability of milk and cream.

The purposes of the work being conducted are to prevent losses due to souring, spoilage, and other causes; to increase the market value of milk to



the farmer, increase consumption of milk, and make rural and urban milk supplies more safe; to effect economies in initial investments and operating costs of milk plants so as to reduce the spread between producers' and consumers' prices through greater efficiency in plant operation; and to discover undesirable practices which impair the market qualities of milk and cream and devise remedial measures.

The results of these researches enable dairymen to reduce losses through rejected and low-quality milk; extend markets over greater areas; tend to hold down the "spread" between producer and consumer by the introduction of more efficient methods; and increase consumption because of a more acceptable product.

3. Investigations of the Utilization of Milk in the Manufacture of Milk Products.—Nearly one-half of the milk produced in the United States is used in making manufactured products. While the consumption of fluid milk is relatively high, the per-capita consumption of manufactured milk products is much lower than in most other dairy countries. This is due in some measure to the inferior quality of much of the domestic product, and this in turn is due to a lack of understanding of the fundamental principles involved and the absence of scientific control of manufacturing methods. Even under good conditions there are losses from abnormal bacterial fermentations and faulty technique.

In addition to the primary products made from milk, enormous quantities of by-products (skim milk, buttermilk, and whey) are produced. Although the cost of producing the milk solids in these by-products is nearly as great as the cost of producing the milk fat, adequate methods of converting the solids of these by-products into human food have been devised to only a limited extent. The object of this project is, therefore, to discover the basic principles involved in handling milk and manufacturing it into various products and by the application of these principles to improve the quality and reduce the cost of manufacture; also to develop the domestic manufacture of certain dairy products now imported from foreign countries and to establish these methods in the industry. The work is conducted under the following projects:

(a) Basic Investigations of the Bacteriology and Chemistry of Milk.—The manufacture of all dairy products is based on the control of bacteriological and chemical changes in milk, and the results of studies of these changes provide the basis for all laboratory investigations of an applied nature. Therefore, work on the bacteriology and chemistry of milk is fundamental to practically all investigational work dealing with the manufacture of milk products. The work of the Bureau has included many investigations of an abstract nature which are of interest primarily to scientists. Such studies have frequently led to unforeseen results of great commercial value. At the present time these investigations include:

- (1) A study of the physico-chemical relations of the constituents of milk with reference to the stability of the various suspensions and solutions.
- (2) The composition of milk fat with special attention to the identity and characteristics of some of the minor constituents.





- (3) The effect of one species of bacteria on the development of another species when they are grown together. In some cases there is a mutual stimulating effect but in others a marked inhibitory effect. This is of special importance in selecting cultures of bacteria for cheese making and other manufacturing purposes.
- (4) Study of the factors which influence the germination of bacterial spores and their destruction by heat, ultraviolet rays, etc.

(b) General Investigations of Ice Cream Manufacture.--Ice-cream making has been developed almost entirely by empirical methods, with little understanding of the physical and chemical principles involved. The rapid development of the industry from small plants operating a single freezer to great factories supplying large districts has introduced many problems in connection with the collection and storage of raw materials and the production of a uniform product. The purpose of these investigations, in addition to solving manufacturing difficulties, is to develop methods of manufacture whereby the quantity of milk solids may be increased and the quality of the product improved.

A systematic study is being made of the numerous factors which influence the physical properties of ice cream with the object of formulating the control of homogenization pressures and temperatures, freezing temperatures, whipping times, and other manufacturing details to enable the maker to obtain ice cream of any desired character.

Methods are developed for separating the constituents of milk so that larger amounts of milk solids may be used without encountering defects produced by an excess of milk sugar.

(c) General Investigations of the Manufacture of Butter and By-products.--In the manufacture of butter and cheese over 4,500,000,000 pounds of milk solids are produced annually in the form of skim milk, buttermilk, and whey. While only a relatively small part of this is actually wasted, yet from the standpoint of its high food value the most of it is utilized very inefficiently. The investigations of the Bureau are directed toward a more efficient utilization of these byproducts by converting them into forms which may be used in human foods and by developing new industrial uses for those which are not suitable for food. The more important projects on which the laboratories are now actively engaged include:

- (1) A method of preparing a concentrated cheese whey suitable for confectionery, cakes, and other foods. This whey is now in commercial production and is increasing the utilization of milk constituents in confectionery.
- (2) An entirely new process for separating the constituents of whey has been developed. This yields three products: Lactose of pharmaceutical grade; a powder of high protein content and excellent whipping properties; and a residue containing the vitamins of the whey in a concentrated form. The process is in the pilot-plant stage, but plans are being made for two commercial plants in which it will be used on a large scale.
- (3) The conversion of lactose of casein and cheese whey to lactic acid





by fermentation, the purification of the acid, and development of methods for making solvents, lacquers, plastics, and other products of commercial value. The manufacture of lactic acid is now established on an extensive commercial basis and encouraging progress has been made on new industrial uses of this acid.

- (4) The development of a process available to American manufacturers, without payment of royalties, for making from casein a textile fiber resembling wool. The laboratory stage of this investigation has been completed and the pilot-plant work carried far enough to show that a satisfactory yarn can be made.

(d) Condensed, Evaporated, and Dried Milk Investigations.--Three methods for the preservation of milk have been successfully developed commercially. These are the evaporation of milk under vacuum with the addition of sufficient cane sugar to preserve it (condensed milk); evaporation under a vacuum and heat sterilization in the final container (evaporated milk); and reduction to dryness (dried milk). The first method changes the composition of the milk and is falling into disuse. The application of the second is limited because the sterilization gives the milk a slightly cooked flavor which makes it less desirable than fresh milk. The powder obtained by the third method soon acquires an off-flavor through oxidation. If it were possible to prepare a concentrated milk which would keep indefinitely and, on restoration to its original volume, have the flavor and nutritive value of fresh milk, the problem of distribution would be greatly simplified and consumption increased. If the bacterial spores which make necessary the high heat required for sterilization could be made more sensitive to heat, the sterilization temperature of evaporated milk could be materially lowered, with a consequent elimination of the cooked flavor of this product. Other possibilities of improving the flavor of evaporated milk are also investigated.

(e) General Investigations of Cheese Manufacture.--The United States makes over 600,000,000 pounds and imports over 60,000,000 pounds of cheese annually. To make the quantity of cheese imported would require the milk from 150,000 average cows. This imported cheese is nearly all of those varieties which command relatively high prices and consequently yield greater returns to the producers of the milk than the ordinary Cheddar cheese.

While the quantity of cheese manufactured in this country is greater than in any other single country, the per-capita consumption is lower than in most of the other dairy countries, due partly to the low quality of a part of the domestic cheese and in some measure to the unattractive packages in which it is marketed. If this country's per-capita consumption of cheese were on a par with that of most European countries, the number of dairy cows would have to be at least doubled in order to supply the necessary amount of milk.

Investigations being conducted by the Bureau of Dairy Industry have for their object the determination of the biological and chemical factors involved in the production of the characteristic flavors and physical properties of various foreign and domestic varieties of cheese, as well as the improvement of the quality of domestic cheese to provide an additional market for milk.

[illegible]

The more important investigations on which the laboratory is now working include:

- (1) Methods of factory control of the composition and bacterial fermentations in Swiss cheese to insure a more uniformly high grade of cheese. This includes a study of the possibility of making this cheese from pasteurized milk, thus eliminating the defects due to inferior milk.
- (2) Determination of the relationship of the bacteriological condition of the milk and of the rate of development of acid to the quality of the cheese.
- (3) Perfection of a process of making cheese from homogenized milk so that cheese will not leak fat when exposed to high temperatures. This investigation has progressed to the plant stage and has made possible the export of Cheddar cheese to tropical and sub-tropical countries.
- (4) Completion of the investigation on the packaging of cheese in valve-vented cans. This is now in commercial production but certain special uses require further investigation.

(f) State and Industry Relations for Milk Products Manufacture.--In the research work of the laboratories of the Bureau facts are established which modify existing methods of dairy manufacturing, new processes are established, new products developed, and improved methods of applying scientific control to factory practices worked out. While this new information is published in one form or another, much of it has only potential value until factory operators are convinced by demonstration of its practicability.

The Bureau is now working in cooperation with State organizations on the introduction of improved methods of making Swiss cheese, on packaging Swiss and Cheddar cheese in valve-vented cans, on the manufacture of lactic acid and derivatives of lactic acid by the fermentation of whey, and on the distribution of concentrated and refrigerated milk in subtropical countries where there is a milk shortage.

(g) Inspection of Renovated Butter Factories (Regulatory).--The administration of regulatory acts relating to sanitary condition of process or renovated butter factories, the inspection of material and ingredients entering into the manufacture of the finished product, the approval of brands and labels used, and the inspection and certification of process or renovated butter intended for export are functions of the Bureau of Dairy Industry conducted under this project. The investigation of the fraudulent manufacture or labeling of this product is also conducted in cooperation with the Bureau of Internal Revenue of the Treasury Department.



## CHANGE IN LANGUAGE

## UNDER PARAGRAPH "TOTAL, BUREAU OF DAIRY INDUSTRY"

It is recommended that the language of this paragraph be amended by substituting for the word "Total" the following:

"In all, salaries and expenses, to be accounted for as one fund"

For explanation of this change see general note in these Justifications under Office of Experiment Stations, page 54.

## SUPPLEMENTAL FUNDS

Direct Allotments

| Project                                | : Estimated : Estimated :              |            |            |
|--|--|------------|------------|
|  | : obligations; obligations; Obligated, |            |            |
|  | : 1940                                 | : 1939     | : 1938     |
| Special Research Fund,                 | :                                      | :          | :          |
| <u>Department of Agriculture</u> ..... | : \$40,520                             | : \$37,520 | : \$25,988 |
|  | :                                      | :          | :          |

THE HISTORY OF

THE CITY OF BOSTON

FROM THE FIRST SETTLEMENT TO THE PRESENT TIME

BY SAMUEL JOHNSON

IN TWO VOLUMES

LONDON

1790

Printed by J. JOHNSON, in Pall-mall.



BUREAU OF PLANT INDUSTRY

## (a) SALARIES AND EXPENSES - PREAMBLE

Change in Language

It is recommended that the preamble to "Salaries and Expenses" be amended by insertion of authority for the investigation of "soils and soil-plant relationships", in order to specifically describe the soils activities, transferred in the estimates, from the Bureau of Chemistry and Soils to the Bureau of Plant Industry.

## (b) GENERAL ADMINISTRATIVE EXPENSES

|   |           |
|---|-----------|
| Appropriation Act, 1939.....  | \$189,242 |
| Allotment for transfer in 1940 Estimates to<br>"General Administrative Expenses", Agricultural<br>Marketing Service (incident to transfer<br>of Federal Seed Act enforcement work to that<br>bureau).....   | - 1,800   |
| Allotment for transfer in 1940 Estimates from<br>"General Administrative Expenses", Bureau of<br>Agricultural Chemistry and Engineering<br>(incident to transfer from latter bureau of<br>appropriations for "Soil Chemistry and<br>Physical Investigations and "Soil Survey"). | +15,000   |
| Total available, 1939.....  | 202,442   |
| Budget Estimate, 1940.....  | 202,442   |

## PROJECT STATEMENT

| Project                                      | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-----------|---------------------|---------------------|
| General administration and business service. | \$202,273 | \$202,442           | \$202,442           |
| Unobligated balance.....                     | 289       | - - -               | - - -               |
| Total appropriation.....                     | 202,562   | 202,442             | 202,442             |

## WORK UNDER THIS APPROPRIATION

The direction of the research and service activities of the Bureau of Plant Industry, administration of fiscal affairs, general supervision of personnel and administrative review and preparation of research and other publications and bibliographical and related work are carried on under this appropriation.



## (c) ARLINGTON FARM

Appropriation Act, 1939..... \$49,414  
 Budget Estimate, 1940..... 49,414

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| Arlington Farm--maintenance of facilities for basic plant research..... | \$47,358 | \$49,414            | \$49,414            |
| Unobligated balance.....  | 2,056    | - - -               | - - -               |
| Total appropriation.....  | 49,414   | 49,414              | 49,414              |

## WORK UNDER THIS APPROPRIATION

A highly improved 400-acre tract is maintained in Virginia, near Washington, D. C., provided with specially equipped laboratories, greenhouses, barns, shops, and other buildings to furnish facilities for conducting experiments and practical farm tests covering a wide range of research work, national in scope, principally for the Bureau of Plant Industry, but also available for the Bureaus of Agricultural Chemistry and Engineering, Public Roads, Entomology and Plant Quarantine, the Soil Conservation Service, and other branches. By furnishing similar facilities common to the many activities from a central station, duplication of effort and equipment is avoided and the cost of operation appreciably reduced. This item provides funds for the general maintenance of the plant and farm facilities. The work of other divisions in the Bureau and of other bureaus and departments is conducted at cost on a reimbursement basis.

## (d) BOTANY

Appropriation Act, 1939..... \$76,635  
 Budget Estimate, 1940..... 76,635

| Projects                            | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|-------------------------------------|----------|---------------------|---------------------|
| 1. Botanical investigations.....    | \$36,380 | \$36,635            | \$36,635            |
| 2. Weed control investigations..... | 39,879   | 40,000              | 40,000              |
| Unobligated balance.....            | 376      | - - -               | - - -               |
| Total appropriation.....            | 76,635   | 76,635              | 76,635              |

[illegible]

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1. *Journal of the American Medical Association*, 1967; 201: 1001-1002.

4.  $F_{1, 2, 3} = 0$       5.  $G_{1, 2, 3} = 0$       6.  $H_{1, 2, 3} = 0$

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*Journal of Management Studies*, 19(6), 701-718.

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## WORK UNDER THIS APPROPRIATION

General.--Research under this appropriation consists of the identification of wild and cultivated plants; taxonomic studies of special genera to serve as the basis of exploration for native forms of crop plants and as the basis for breeding operations in those fields; special systematic studies of grasses that serve as a basis for forage, range, and erosion-plant collection work; the domestication and improvement of wild plants, particularly the blueberry; and weed control investigations.

Botanical studies conducted under this project serve as a starting point for numerous investigations made by the various branches of the Bureau of Plant Industry and other bureaus of the Department. With the increased demands made upon this project by the Forest Service and the erosion-control agencies and the inevitable increase of duties resulting from the development of the National Arboretum, work under this project has become of major importance. The studies and identifications hereunder are essential to the development of accurate and dependable plans for future work.

The work in weed control is to determine the most effective and economical methods of controlling or eradicating field bindweed (European morning glory) and other noxious weeds. Control methods studied include tillage and cultural practices, crop rotations, and the use of chemicals. Field and laboratory experiments are being conducted in seven western States in cooperation with the State agricultural experiment stations. The justification for these investigations lies in the very wide and rapid dissemination of bindweed in past years and the very great difficulty and enormous expense encountered by farmers in eradicating it. Farms otherwise productive have been abandoned because of bindweed infestation, and in several States the pest is considered so serious that loans can not be secured on infested farms. It is very difficult to eradicate bindweed entirely once it becomes firmly established. It is believed that research with chemical treatments and with cultivating and cropping methods will indicate feasible and economical methods of control.

1. Botanical Investigations.--Work on economic botany consists chiefly of studies and identifications of plants other than grasses for various bureaus of the Department, including the preparation of monographic studies of various crop plants as well as reports on range and distribution of those species that are needed by crop workers in other Divisions. Assistance is also given to agricultural experiment stations, farmers, nurserymen, and other individuals and organizations. Information derived from this work is of primary importance in grazing and erosion work, investigations of plants poisonous to stock, forage experiments, and the preparation of programs of plant breeding in other divisions. Correct botanical identification is of primary importance for all breeding projects involving cultivated plants and their wild relatives. Accurate and dependable studies and identifications are essential as a basis for investigations if reliable results are to be obtained.

Work on grass investigations includes systematic studies of both domestic and foreign grasses which serve as a basis for important grass investigations from the forage and erosion standpoint. The collection of grass specimens maintained is the largest and most valuable reference collection in the world.





The botanical studies conducted and publications built up as a result of these studies comprise a reference collection of information which is the basis of all important grass investigations of the Department. With the increased importance of forage and soil-erosion projects, this work has become an important factor in the conduct of the investigations. Adequate and accurate reference is essential as a starting point for our grass projects.

The principal work on blueberry investigations has been the breeding of new varieties of blueberries maturing earlier and later than those now in use, or of still better flavor and other desirable commercial qualities, or adapted to a latitude and climate farther south than existing varieties. The wide interest in blueberry culture has developed a rather extensive correspondence on the subject. The blueberry investigations have resulted in the domestication and improvement of the wild blueberry; in the addition of a luscious and healthful fruit to the dietary of city dwellers; in the establishment of a thriving and growing new industry of blueberry culture; and in the utilization of areas of special, strongly acid soils not adapted to other agricultural uses.

A similar project is conducted in breeding American varieties of gooseberries, using native species in themselves suited to our conditions but now of inferior quality.

2. Weed Control Investigations.--Recent investigations indicate that certain crops such as winter rye, alfalfa, and soybeans compete with bindweed more successfully than do corn, spring grain, potatoes, and sugar beets. Experiments on the frequency of cultivating to destroy bindweed show that the number of cultivations usually recommended can be lowered materially if cultivation is delayed each time until the new growth has exhausted a larger portion of the reserve food material left in the roots. These and other investigations should result in the development of practices that will permit the eradication of weeds at a greatly reduced expense.



## (e) CEREAL CROPS AND DISEASES

Appropriation Act, 1939.....\$532,371  
 Allotment for transfer in 1940 Estimates  
   from "Seed Investigations" (incident to  
   transfer of regulatory work under that  
   item to the Agricultural Marketing Service) + 8,750  
 Total available, 1939..... 541,121  
 Budget Estimate, 1940..... 541,121

## PROJECT STATEMENT

| Projects  | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-------------|---------------------|---------------------|
| 1. Barley investigations.....   | \$63,485    | \$64,605            | \$64,605            |
| 2. Corn investigations.....   | 133,910     | 130,305             | 130,305             |
| 3. Seed flax investigations.....  | 14,245      | 15,145              | 15,145              |
| 4. Sorghum investigations.....  | 25,077      | 26,098              | 26,098              |
| 5. Oat investigations.....  | 43,035      | 43,875              | 43,875              |
| 6. Rice investigations.....   | 43,225      | 44,155              | 44,155              |
| 7. Wheat investigations.....  | 216,890     | 216,938             | 216,938             |
| Transferred to "Dry-Land Agriculture"<br>for regressing investigations..... | 3,675       | - - -               | - - -               |
| Unobligated balance.....  | 6,929       | - - -               | - - -               |
| Total appropriation.....  | (a) 550,471 | (a) 541,121         | 541,121             |

(a) Amounts for 1938 and 1939 include allotment of \$8,750 as set forth in table above (transferred in Estimates for 1940).

## WORK UNDER THIS APPROPRIATION

General.--Research work conducted under this appropriation includes experiments with cultural methods for cereal crops and the development of new and improved methods; comparison of the yield and adaptation of different varieties to different regions and of their quality for different uses, together with the breeding and selection of improved and better-adapted varieties; and the development of methods of controlling the diseases of all cereal crops, including the breeding of disease-resistant varieties. Cooperative experiments are carried on at most of the State agricultural experiment stations but no independent field stations are maintained.

The justification for this work lies in the importance of the cereal crops to the agriculture of the United States and in the many difficult problems confronting their successful production. Cereal crops not only supply directly an important part of the dietary requirements of the people, but as food for livestock are the basis of our livestock and dairy industries as well. Cereal crops occupy about 225,000,000 acres each year. Corn, the principal cereal, is the most important single crop of the country, being grown on about 100,000,000 acres. It is the backbone of American agriculture. Increased



efficiency and reduced costs are necessary for the profitable production of cereal crops and the consequent well-being of our agricultural population. Increased efficiency and reduced costs can be attained through improvement in practices and varieties which will reduce the hazards incident to disease, reduced fertility, and, insofar as possible, the action of cold and drought. Without the improved varieties even now available, the results of the disastrous drought during recent years would have been even more marked. Each of the cereal crops is attacked by 4 to 10 important diseases that could be controlled if resistant varieties or suitable treatments were developed.

1. Barley Investigations.--During recent years barley has been grown on approximately 12,000,000 acres annually. It is an important feed grain, and more than 64,000,000 bushels were used in the malt and liquor industries for the fiscal year ending June 30, 1937. Malting quality is a most important factor in determining price, high quality carrying a substantial market premium. The control of diseases and the improvement of varieties to insure quality is imperative in order to meet market needs and to insure profitable production.

2. Corn Investigations.--Corn is the most important single crop grown in this country and is the foundation of much of the American livestock industry. It normally occupies approximately 100,000,000 acres annually. Higher-yielding strains are needed to reduce production costs and to eliminate preventable hazards. Disease and insect resistant strains are needed to avoid crop losses and commercial damage. Disease control also is badly needed to prevent losses in growing and marketing corn.

3. Seed Flax Investigations.--Seed flax production is not extensive but in the areas where the crop is grown it is an important source of cash income. Flax is grown on more than 2,000,000 acres annually but the quantity produced is much less than domestic consumption. There is an opportunity for a profitable increase in the present acreage. The production of this crop is largely dependent on disease-resistant varieties, but in developing such varieties the yield and quality of oil have not been given sufficient attention. There is a definite need for improved varieties combining disease resistance with seed yield, oil yield, and oil quality.

4. Sorghum Investigations.--Sorghums are grown on about 10,000,000 acres annually. They supply most of the grain and forage in the south-central United States, where drought and heat resistant summer crops are essential. Several improved varieties have been developed, but more dependable grain types are needed in the less favored sections and varieties of feeding quality are desired in other areas. Disease and insect resistance to reduce preventable losses are also needed. Broomcorn varieties producing better quality brush and less affected in quality by weather conditions are also badly needed.

5. Oat Investigations.--Oats are the most important small-grain feed crop of the country. Their greatest value lies in their use in crop rotations, usually following corn, and in furnishing a nurse crop for seeding clover and grasses. About 40,000,000 acres of oats are grown annually. The quality of the crop is often seriously reduced by heat and drought and by diseases. While progress has been made in developing better varieties, much remains to be done in breeding to reduce losses from weather and disease hazards that increase the costs of grain production.





6. Rice Investigations.--Rice is a specialized crop grown on a limited acreage so far as the country as a whole is concerned (750,000 to 950,000 acres annually), but in the localities where it is grown in Arkansas, Louisiana, Texas, and California it is a leading cash crop, yielding large acre returns. Lands used for rice are not well suited for other crops. The peculiar conditions under which the crop is grown, requiring constant flooding of the land, introduce many distinct problems in soil fertility, rotation, pests, diseases, and culture that require solution. Varieties of better culinary value, also, are needed to increase market demands. Methods of handling rice to obtain a high milling quality are equally important.

7. Wheat Investigations.--Wheat is the staple food crop of the country, is the leading crop in large and important areas, supports an extensive manufacturing and processing industry, and has been a most important export product. Profits in wheat production are dependent on reducing hazards from cold, drought, disease, and poorly adapted varieties and on the development of cultural and rotation practices that will reduce expense and at the same time stabilize production. Much has been accomplished along these lines, but much still remains to be done to obtain desirable types for all areas.



## (f) COTTON AND OTHER FIBER CROPS AND DISEASES

Appropriation Act, 1939.....\$399,385  
 Budget Estimate, 1940.....399,385

## PROJECT STATEMENT

| Projects   | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-----------|---------------------|---------------------|
| 1. <u>Cotton investigations (production, improvement, and diseases):</u>                                     |           |                     |                     |
| (a) General cotton breeding and improvement investigations.....  | \$102,714 | \$101,020           | \$101,020           |
| (b) Egyptian cotton breeding and improvement investigations.....   | 22,070    | 22,178              | 22,178              |
| (c) Sea Island cotton breeding and improvement investigations.....   | 15,000    | 14,700              | 14,700              |
| (d) Cotton genetic investigations.....   | 53,300    | 53,800              | 53,800              |
| (e) Studies of the structure and growth of the cotton plant and of cotton fibers.....                        | 9,250     | 9,300               | 9,300               |
| (f) Cotton plant nutrition and other physiological investigations.....                                       | 65,200    | 64,500              | 64,500              |
| (g) Cotton disease investigations.....   | 28,000    | 28,000              | 28,000              |
| (h) Cotton quality research, from the standpoint of production....   | 39,600    | 38,400              | 38,400              |
| (i) Cotton culture investigations.....   | 9,150     | 9,200               | 9,200               |
| (j) Investigations on establishing improved cotton seed stocks, including one-variety community methods..... | 39,500    | 40,000              | 40,000              |
| Total, Cotton investigations (production, improvement, and diseases).....                                    | 383,784   | 381,098             | 381,098             |
| 2. <u>Fiber plants other than cotton, Investigations of:</u>   |           |                     |                     |
| (a) Hard fiber studies.....  | 8,135     | 8,050               | 8,050               |
| (b) Fiber flax agronomic and breeding investigations.....  | 4,751     | 4,650               | 4,650               |
| (c) Hemp investigations.....   | 5,685     | 5,587               | 5,587               |
| Total, Fiber plants other than cotton.....   | 18,571    | 18,287              | 18,287              |
| Transferred to "Dry-Land Agriculture" for regressing investigations.....                                     | 2,475     | - - -               | - - -               |
| Unobligated balance.....   | 1,605     | - - -               | - - -               |
| Total appropriation.....   | 406,435   | 399,385             | 399,385             |



## WORK UNDER THIS APPROPRIATION

General.--The work done under this appropriation consists of the investigation of cultural practices for growing cotton; the breeding of superior varieties of cotton, including Egyptian and Sea Island; study of the effect of soil, climate, and other factors on the yield, quality, and values of cotton fiber; study of chemical, physical, and other properties of cotton fibers which determine values for specified uses, and the measurement of probable values by means of these properties; investigation of cotton diseases and their control, including breeding for disease resistance; utilization and maintenance of superior strains of cotton through the organization of single-variety communities; and investigations of hemp and flax fiber production and of hard fibers and other fibers used for ropes, twines, etc. This work is conducted in cooperation with the Bureaus of Agricultural Economics, Agricultural Chemistry and Engineering, and Entomology and Plant Quarantine, with the State agricultural experiment stations and extension services, and with certain counties and group organizations.

1. Cotton Investigations.--This work consists of breeding operations to develop strains and types of cotton superior in yield and in lint character and resistant to climatic and other factors reducing yield and quality. It also includes studies of the relation of climatic and other factors to fiber yield and quality and of means for measuring quality factors so that new cottons being developed may be tested for quality before distribution. It likewise includes studies of cotton diseases and their control and of all other factors having to do with growing satisfactory yields of high-quality cotton.

Cotton is the bread-and-butter cash crop of the entire cotton-producing area. The crop also is of primary importance in domestic commerce and manufacture, six million 500-pound bales (in round numbers) being the normal domestic consumption, and is the country's principal agricultural export product. The 1937 crop occupied about 34,000,000 acres and in the past has totaled in excess of 40,000,000 acres. The 1937 cotton crop, including the value of the lint and seed, was worth in excess of \$820,000,000.

2. Fiber Plants Other Than Cotton.--Work under this project includes the investigation of hemp and flax fiber production in the United States and of hard fibers such as abaca (Manila hemp), maguoy, sisal, and honequen in the tropics; and all plant fibers, except cotton, used for ropes, twines, yarns, woven fabrics, hats, matting, and stuffing or filling.

Flax fiber production is now established as a profitable crop in Oregon, and recent experiments of the Department indicate that this industry may be revived in certain areas in the East. The marked increase in the hemp acreage in this country in recent years shows increased interest in this crop. There is need for continued plant breeding of both fiber flax and hemp and further experimental work with relation to soil types and agronomic practices in growing these crops and preparing the fibers. Hard fibers, produced only in the tropics, are necessary for bindertwine and all high-grade cordage. It is important that coordination be continued between twine and cordage manufacturers in this country and fiber producers in the tropics and that standards of fiber quality be maintained.





## (g) DRUG AND RELATED PLANTS

Appropriation Act, 1939..... \$47,139  
 Budget Estimate, 1940..... 47,139

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| 1. Drug, poisonous, insecticide, oil, and related plant investigations..... | \$32,423 | \$36,279            | \$36,279            |
| 2. Hop production and disease investigations.....                           | 11,920   | 10,860              | 10,860              |
| Unobligated balance.....  | 2,796    | - - -               | - - -               |
| Total appropriation.....  | 47,139   | 47,139              | 47,139              |

## WORK UNDER THIS APPROPRIATION

General.--The work under this appropriation consists of investigations of plants yielding drugs, poisons, insecticides, tanning materials, essential oils, drying oils, and perfumes with respect to their culture, their constituents, and their possibilities as crops in the United States; also studies on hop production with particular reference to the improvement of the quality of domestic hops and to the control of diseases, particularly the downy mildew, through field practices and the development of the new resistant varieties.

1. Drug, Poisonous, Insecticide, Oil, and Related Plant Investigations.--

Plants that are important sources of products used in the manufacture of medicines, pharmaceuticals, flavoring materials, perfumes, insecticides, tanning materials, paints and varnishes, and related commodities are grown experimentally to determine their cultural requirements, the proper methods of handling, the methods of obtaining the commercial products from them, their qualities under various conditions, the possibilities of their improvement through selection and other means, and the cost of production as a basis for their introduction into American agriculture.

This country is dependent upon foreign countries for most of these products. In some cases such sources are not available during extensive world disturbances. Their domestic production insures a more steady supply and better quality for the consuming industries, and the growing of the plants producing them provides noncompetitive cash crops for farmers to turn to in favorable localities during periods of staple crop surpluses. In view of the fact that farmers are entirely unacquainted with the special requirements of such plants, much information must be obtained by preliminary investigations to provide the



necessary background for their commercial introduction. Because the supply of chestnut wood, which is the chief source of tannin for the tanning industry, is rapidly being exhausted, additional sources of domestic supply are sought. New domestic tannin plants which may be grown under cultivation are being studied to determine their cultural requirements, cost of production, and value as possible commercial sources of tannin. This is primarily the objective of this project.

2. Hop Production and Disease Investigations.--Under this project hop growers are assisted along two lines: (a) The relationship of various production factors to the brewing qualities of hops are studied as a means of bringing about a general improvement in the quality and uniformity of domestic hops, and (b) growers are advised regarding cultural practices that reduce the spread of downy mildew and other diseases and instructed in the use of fungicide sprays and dusts to control the losses while a more permanent solution is sought through the development of new varieties with good commercial qualities and resistant to the disease.

The brewing industry is dependent almost entirely on the Pacific Coast States for its supply of domestic hops. Unless the downy mildew is effectively controlled or resistant varieties provided, hop growing may have to be abandoned in many localities where it is now an important industry. Aside from the economic loss suffered by the established growers, the resultant shortage would necessitate more extensive use of the more expensive foreign hops, with a corresponding increase in the cost of brewing.



## (h) DRY-LAND AGRICULTURE

Appropriation Act, 1939..... \$226,828  
 Budget Estimate, 1940..... 226,828

## PROJECT STATEMENT

| Projects   | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|-------------|---------------------|---------------------|
| <u>Dry-land agriculture investi-</u><br><u>gations:</u>  |             |                     |                     |
| (a) Dry-land field crop production<br>investigations.....  | \$158,729   | \$159,862           | \$159,862           |
| (b) Dry-land fruit and vegetable<br>production investigations.....   | 27,765      | 28,277              | 28,277              |
| (c) Cooperative farm windbreak<br>demonstrations and experi-<br>mental test plantings.....                       | 26,454      | 23,689              | 23,689              |
| (d) Regrassing investigations in<br>dry-land areas.....  | 101,000     | 15,000              | 15,000              |
| Received by transfer for regrassing<br>investigations from "Salaries and<br>Expenses, Bureau of Plant Industry": |             |                     |                     |
| Cereal crops and diseases.....   | - 3,675     | - - -               | - - -               |
| Cotton and other fiber crops<br>and diseases.....  | - 2,475     | - - -               | - - -               |
| Experimental greenhouse<br>maintenance.....  | - 460       | - - -               | - - -               |
| Forage crops and diseases.....   | - 2,085     | - - -               | - - -               |
| Forest pathology.....  | - 1,610     | - - -               | - - -               |
| Fruit and vegetable crops and<br>diseases.....   | - 7,115     | - - -               | - - -               |
| National arboretum.....  | - 235       | - - -               | - - -               |
| Plant exploration and intro-<br>duction.....   | - 1,375     | - - -               | - - -               |
| Soil-fertility investigations.....   | - 1,000     | - - -               | - - -               |
| Sugar-plant investigations.....  | - 2,000     | - - -               | - - -               |
| Tobacco investigations.....  | - 825       | - - -               | - - -               |
| Western irrigation agriculture ...   | - 715       | - - -               | - - -               |
| Unobligated balance.....   | 1,200       | - - -               | - - -               |
| Total appropriation.....   | (a) 291,578 | 226,828             | 226,828             |

(a) Includes \$76,000 appropriated in third Deficiency Act, 1937,  
 for regrassing investigations in dry-land areas.





## WORK UNDER THIS APPROPRIATION

General.--Under this appropriation the problems of agricultural and horticultural development of the Great Plains and Inter-mountain areas, a region of more than 400,000 square miles, classed as semiarid, are studied at field stations to obtain the fullest possible information concerning soil and climatic conditions throughout the region and the agricultural effectiveness of each of the many different methods of tillage and crop rotations that can be considered as more or less suitable for this region where irrigation is not available.

Field stations are maintained at Akron, Colo., Tucumcari, N. Mex., Mandan, N. Dak., Lawton, Okla., Woodward, Okla., Big Spring, Tex., Dalhart, Tex., and Sheridan, Wyo. At these stations the investigations are generally in cooperation with the State Experiment Station; facilities also are provided for investigations by other divisions of the Department.

Investigations are also conducted at stations maintained by the Division of Irrigation Agriculture, Bureau of Plant Industry, at Huntley, Montana, and Newell, South Dakota.

Investigations also are conducted in cooperation with State stations located at Colby, Kans., Garden City, Kans., Moccasin, Mont., Dickinson, N. Dak., Archer, Wyo., Hays, Kans., Havre, Mont., North Platte, Nebr., and Pendleton, Oreg.

Dry-land agriculture investigations are conducted under the following main activities:

(a) Dry-Land Field Crop Production Investigations.--The work under this project consists of rotation and tillage experiments with cereal crops, forage crops, and cotton, and studies of pasture conservation and development under dry-land conditions in the Great Plains and Inter-mountain areas. (The Bureau of Animal Industry cooperates with livestock experiments at Big Spring, Texas). Crop rotation, cultural methods, and pasture practices are concerned not only with the immediate effects, but with the cumulative effects, in increasing, maintaining, or decreasing the productivity of the soil, and consequently must be continuous and of long duration.

Fundamental differences exist between soils in dry-farming areas and those in humid areas. The general principles basic to crop production under conditions of restricted rainfall involve tillage and rotation practices necessary to store the maximum amount of moisture in the soil and to use it efficiently in crop production, together with the prevention of undesired plant growth which would exhaust stored moisture. Tillage practices have a relation to nitrification and the storage of nitrates with direct effects on crop yields and quality. Special problems are connected with preventing erosion by wind and water, varietal adaptation, cropping limitations, and other factors. On the dry-land field stations particular attention is directed to outlining practices which seem best in the light of present information, with a parallel development of underlying principles.



(b) Dry-Land Fruit and Vegetable Production Investigations.---The work under this project consists of demonstrations of the feasibility of growing in this semiarid region certain fruits and vegetables which can be produced on a home-garden scale.

(c) Cooperative Farm Windbreak Demonstrations and Experimental Test Plantings.---Under this project trees and ornamental plants that can be grown in dry regions are propagated and placed with experimenters for testing, and demonstrations of trees planted as farm windbreaks are developed and encouraged. The dry lands naturally are treeless regions, but gratifying success has attended systematic effort to determine the kinds of trees and methods of care and culture necessary to their successful growth for shade and farmstead protection.

(d) Regrassing Investigations in Dry-Land Areas.---This project provides for investigations at the United States Southern Great Plains Field Station at Woodward, Oklahoma, to determine the most efficient and economic methods for regrassing large areas and for the improvement and development of grasses and other forage plants suitable for use under subhumid, semiarid, or dry-land conditions. The reestablishing of grazing in many sections of the Great Plains is basic to the agriculture of the entire region. Various agencies of the Government are engaged in extensive projects in the area. In order that their programs may go forward on a sound, efficient basis, more comprehensive research information is necessary. The investigations of the Division of Dry-Land Agriculture are coordinated with those of the Division of Forage Crops and Diseases and other interested agencies in a concerted attack on the many complex problems of the "dust bowl".

(i) EXPERIMENTAL GREENHOUSE MAINTENANCE

Appropriation Act, 1939..... \$77,372  
 Budget Estimate, 1940..... 77,372

PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| Maintenance and operation of<br>experimental greenhouses and<br>adjacent experimental grounds<br>and plots..... | \$78,067 | \$77,372            | \$77,372            |
| Transferred to "Dry-Land Agriculture"<br>for regrassing investigations.....                                     | 460      | - - -               | - - -               |
| Unobligated balance.....  | 105      | - - -               | - - -               |
| Total appropriation.....  | 78,632   | 77,372              | 77,372              |



## WORK UNDER THIS APPROPRIATION

The Bureau maintains a range of thirty-two greenhouses, supplemented by a small adjacent outdoor area, to provide for experimental work with a wide range of plants. The greenhouses are operated to furnish necessary experimental facilities to the several appropriation items, particularly those dealing with the diseases of plants caused by bacteria, fungi, or nemas. Provision is also made for the maintenance of experimental plants for hybridization or other plant-breeding or plant-physiological studies.

## (j) FORAGE CROPS AND DISEASES

|  |               |
|--|---------------|
| Appropriation Act, 1939.....   | \$294,993     |
| Allotment for transfer in 1940 Estimates from<br>"Seed Investigations" (incident to transfer<br>of regulatory work under that item to the<br>Agricultural Marketing Service),..... | + 3,450       |
| Total available, 1939.....   | 298,443       |
| Budget Estimate, 1940.....   | 308,450       |
| Increase.....  | <u>10,007</u> |

## PROJECT STATEMENT

| Projects   | 1938        | 1939<br>(Estimated) | 1940<br>(Estimated) | Increase       |
|--|-------------|---------------------|---------------------|----------------|
| 1. Alfalfa investigations.....   | \$58,204    | \$57,976            | \$57,976            | - - -          |
| 2. Clover investigations.....  | 28,560      | 28,544              | 28,544              | - - -          |
| 3. Soybean investigations.....   | 19,225      | 18,820              | 18,820              | - - -          |
| 4. Lespedeza, cowpea, and miscellaneous legume investigations            | 39,108      | 39,650              | 39,650              | - - -          |
| 5. Grass investigations.....   | 153,575     | 153,453             | 163,460             | + \$10,007 (1) |
| Transferred to "Dry-Land Agriculture" for regrassing investigations..... | 2,085       | - - -               | - - -               | - - -          |
| Unobligated balance.....   | 2,886       | - - -               | - - -               | - - -          |
| Total appropriation.....   | (a) 303,645 | (a) 298,443         | 308,450             | + 10,007       |

(a) Amounts for 1938 and 1939 include allotment of \$3,450 as set forth in first table above (transferred in Estimates for 1940).

## INCREASE

(1) An increase of \$10,007 to revegetate abandoned, over-grazed, and drought-stricken lands in the "Dust Bowl", where serious problems have been encountered in securing stands of either native or introduced grass species. In any intelligent solution of the serious problem of land use in the Southern Great Plains there must be regrassing of extensive areas which have been plowed





for wheat and other crops, but which disastrous experience has shown cannot be left in such use. The severe drought of the middle thirties and overgrazing incident to short food supplies also have so depleted certain grasslands as to necessitate regrassing. Methods and grass materials to accomplish this immense task are so faulty that with present knowledge it can be accomplished only with great waste of funds and effort. Research to correct this situation is imperative. The President and the Congress have recognized the vital necessity for such research and at the Woodward (Okla.) Field Station of the Bureau of Plant Industry have provided a dam to impound water intended to be used for grass breeding, seed production, and regrassing research for the Dust Bowl area. These facilities will shortly be ready for use. The increase of \$10,007 is needed to provide means to conduct the research made possible by the new facilities. Without this additional amount the new facilities cannot be used effectively, and the primary object for providing them cannot be achieved.

#### WORK UNDER THIS APPROPRIATION

General.--Research under this appropriation includes studies in the production and improvement of plants used for hay, pasturage, and cover crops, some attention being given to fine turfs used in lawns, parks, airports, etc.; the control of diseases of those plants; and determination of their relative hay, pasture, and cover-crop values, their habits of growth, mode of inheritance, seeding habits, and the possibility of their economic utilization.

1. Alfalfa Investigations.--The purpose of this project is to study existing species and varieties of alfalfa which have been assembled from both foreign and domestic sources, with a view to selecting and breeding varieties specially suited to various soil and climatic conditions; study the diseases of alfalfa and effective control measures, through breeding or otherwise; and improve cultural practices as a means of rendering production as stable and profitable as possible. Species, varieties, and regional strains of alfalfa from common sources of seed are compared in a number of different regions throughout the United States. Relative winter hardiness and disease resistance are determined, hay and seed values measured, and factors influencing seed-setting studied, including the effect of *Lygus*, a plant-bug which injures the flowers. Breeding is employed to effect improvement in hay and seed production, as well as resistance to cold and disease. Cultural studies are undertaken to solve problems arising from specific conditions. Drought, cold, disease, and other factors which periodically limit alfalfa production in various parts of the United States may be met most effectively through the use of better farm practice, improved varieties, and methods of culture specially adapted to specific soil and climatic requirements. Hardiness in alfalfa is sought by all growers, and the results of current research indicate the possibility of making available varieties and strains possessing unusual hardiness as measured by relative resistance to drought and disease, particularly bacterial wilt--a disease which reduces the life of alfalfa from ten to three years and necessitates special cultural practices.

2. Clover Investigations.--The object of this project is to study causes of clover failure; introduce into agricultural use new species and varieties; and study the diseases of clover, cultural factors, and the possibility of breeding improved varieties. The work involves the testing of all available species, varieties, and regional strains at different field stations under



widely varying environments; maintenance of nurseries of red, sweet, and other clovers for observation and as sources of breeding material; and cultural experiments, disease studies, and development of breeding technique to secure varieties resistant to disease and winter-killing. Clovers constitute the basis of good-crop-rotation systems in most of the important agricultural areas of the United States. In these areas their culture is fundamental in soil conservation and livestock production. The frequent failures of red clover and cultural difficulties with sweet clover make it necessary to continue the study of factors controlling the successful production of these important crops. The problem of retaining white and other clovers in pasture mixtures with grasses is of particular importance at this time and is commanding widespread attention. Strains of red clover far superior to common strains have been isolated, and their perfection and establishment in farm practice would reduce losses now incurred by farmers through clover failure. Comparable progress is being made with sweet clover in the Western States and with white clovers in the Northeastern States.

3. Soybean Investigations.--This project aims to improve varieties of soybeans being successfully grown in the United States and to find improved varieties for regions now lacking suitable varieties for forage, green manure, pasturage, and seed in the oil and food industries, with special attention to oil and protein content, nutritive value, grain yield, and quality of beans; to test numerous introductions and selections in various parts of the United States, in cooperation with Federal and State experiment stations; to study adaptations of soybean varieties and selections and compare their values for forage, food, and industrial purposes. A tenfold increase in the total production of soybeans in the United States between 1925 and 1937 brought this crop to a position of major importance industrially as well as agriculturally. Its use as a forage plant will continue and probably greatly extend, and with the rapid development of the soybean oil and food industries a considerably increased acreage for seed production may be expected. There are more than 100 oil mills and food factories in the United States which have a crushing capacity of 50,000,000 bushels of soybeans annually. The seed crop alone in 1936 was valued at \$32,791,000, and this is estimated as representing about one-third of the total value of the soybean crop in that year. Soybeans are very susceptible to soil and climatic influence, and there is need for continued research to satisfy both agricultural and industrial demands for superior varieties.

4. Lespedeza, Cowpea, and Miscellaneous Legume Investigations.--The object of this work is to determine the best species of lespedezas, cowpeas, and crotalarias, leading summer forage and cover crops, and varieties of vetches and other winter legumes; to study cultural problems and methods of utilization in soil conservation, forage, and other uses; to select improved varieties, study seed-supply problems, and try to develop disease-control measures; to test seed of all available species and varieties at appropriate field stations, and determine the best methods of production and utilization. By far the greatest part of the land south of the Ohio and Potomac Rivers and from the Atlantic Ocean to the Ozarks consists of acid soils. On these soils alfalfa and clover can not be grown without excessive liming, at prohibitive cost. The need for finding acid-tolerant crops which will grow on these soils and thereby aid in soil conservation, and at the same time furnish forage, is imperative. The Bureau of Plant Industry already has introduced one lespedeza so well suited to soil



and climatic conditions in the region described that in ten years the acreage has increased from nothing to 7,000,000 acres. Continued shifts in agriculture, calling for summer pasturage, will result in extended use of these crops. In the meantime, some winter-acid-tolerant legumes, as Austrian peas, are being limited by disease, and the problem of developing varieties resistant to disease has arisen to demand active interest on the part of plant breeders and pathologists.

5. Grass Investigations.--This project includes the test of introduced and native species and the selection and breeding of superior varieties and regional strains for use as hay or pasturage or in fine turfs; study of the reaction of grasses to various environmental factors and different intensities of use; study of growth and fruiting habits or life history of grasses as a means of insuring full utilization and adequate seed production; development of disease control measures; comparison of species and varieties under field conditions in various parts of the United States; selection of superior strains of different types and their study with reference to productiveness, nutritive value, and seeding habits; further improvement through hybridization; development of methods designed to insure seed supplies of the more promising strains; and cultural tests to determine suitable methods of seeding and establishing turfs and of maintaining them under use, free from weeds and diseases. Over one-half of the total land area of the United States is utilized in some degree as pasturage. Grasses are the foundation of practically all pasture flora and, in addition, they contribute over one-third of the hay produced in the United States. Their high value as soil cover in soil-erosion control is generally recognized, as is their importance in lawns and fine turfs for ornamental and recreational use or for the protection and beautification of highways and railroad right-of-ways. Major adjustment in agricultural practice in the interest of soil conservation and for other reasons are calling for still wider use of grasses, and it is likely that an urgent demand for information pertaining to them will persist indefinitely. Yet, with no other forage plants is there a greater lack of definite information on species, varieties, possibility of improvement, and use. The greatest possible use of grasses will not be realized until knowledge concerning these important forage plants is increased to a point where it will be as intimate and comprehensive as present knowledge of corn and other cereals.







## (k) FOREST PATHOLOGY

Appropriation Act, 1939..... \$255,392  
 Budget Estimate, 1940..... 255,392

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| 1. Diseases of forest trees and forest products, Investigations of.....           | \$132,111 | \$132,569           | \$132,569           |
| 2. Diseases of shade trees, shrubs, and chestnut orchards, Investigations of..... | 51,005    | 50,948              | 50,948              |
| 3. Epidemic tree diseases, Investigations of.....                                 | 72,071    | 71,875              | 71,875              |
| Transferred to dry-land agriculture for regrassing investigations.....            | 1,610     | - - -               | - - -               |
| Unobligated balance.....  | 2,795     | - - -               | - - -               |
| Total appropriation.....  | 259,592   | 255,392             | 255,392             |

## WORK UNDER THIS APPROPRIATION

General.--Under this appropriation investigations are conducted on the diseases of forest trees, shade trees, and shrubs, with particular reference to control methods; also studies on the decay and discoloration of logs, lumber, pulpwood, posts, and other forest products. The same organisms frequently cause diseases of both forest and shade trees, and some of the fungi found in structural timber may also cause losses in standing trees. The National Government, in its Forest and Park Services, directly controls large forest areas; hence these investigations are of direct service to the Government in the administration of its own properties in addition to their value to private wood producers and wood users. The State agricultural experiment stations are paying relatively little attention to forest and shade-trees diseases. The extensive development in forestry during recent years, including such activities as the soil-erosion work, enlargement of national forests in the East, State and Government civilian conservation camp work, and the Tennessee Valley development, have all placed increasing demands on the services of the pathologists of this Division.

Tree-disease work, in cooperation with the U. S. Forest Service and in some cases with State agencies, is centered at the following points: San Francisco, Calif.; New Haven, Conn.; New Orleans, La.; Morristown, E. J.; Albuquerque, N. Mex.; Asheville, N. C.; Portland, Oreg.; Philadelphia, Pa.; and Madison, Wis. The major portion of the shade-tree work is centered at New Haven, Conn., though each of the other branch offices does some work on this general problem with particular reference to the surrounding region.



1. Diseases of Forest Trees and Forest Products.--Work under this project, carried on mainly in cooperation with the Forest Service, consists of investigations of the native diseases attacking forest nursery stock, plantations, and standing trees in the forests, as well as the fungous discolorations and decays of logs, lumber, etc. Research on the long-introduced diseases, chestnut blight and white-pine blister rust, is also included, forming a basis for the development of resistant forest chestnuts and for the local control of the rust.

The management of Government, State, and private forests on a profitable basis depends upon the prevention of loss from disease and decay. Nursery diseases must be controlled, both for economical production of planting stock and to insure healthy trees for starting field plantations. Because of the long life of forest trees, study of their diseases must be continuous over a period of years. The new method of approach is to consider the effect of diseases on the stand and the timber yield rather than on the individual tree and aims at preventing losses through changes in the methods of forest management rather than by individual treatment. Investigations of fungous injury to forest products are under way, including the last phases of a campaign against sap stain, for which the Southern lumbermen furnished part of the funds, as well as investigations of other problems to meet the demands for information by various groups of wood producers and consumers. The improved control methods developed in this work have already come into large-scale use and are resulting in better lumber for the domestic consumer, as well as aiding Southern lumber to compete in the foreign market. Southwestern farmers have been aided in securing durable fence posts. A service of unique type has been rendered to forestry in the determination for several forest regions of the methods of logging slash disposal that favor most rapid decay and thus decrease of the fire hazard. (The Forest Service, Bureau of Agricultural Chemistry and Engineering, Soil Conservation Service, and Bureau of Entomology and Plant Quarantine cooperating.)

2. Diseases of Shade Trees, Shrubs, and Chestnut Orchards.--Street, park, and ornamental trees make up a material part of the wealth of this country. Intangible values, such as reduction of temperature in summer and the enhancement of the beauty of a place, are difficult to estimate. Losses of trees from diseases, unfavorable climatic factors, and decay of the heartwood, with resulting breakage, are taking place in every locality of the country. The primary object of the work under this project is the prevention or reduction of these losses. Most of the diseases have never been investigated and others have been only partially studied. Improved methods of tree repair and better wound dressings are being studied. However, a large part of the funds of this project is required to determine the diseases and answer the correspondence sent in by the general public.

The increased number of visitors in National and State parks have created new problems, particularly with reference to the packing of soil around the more valuable trees and diseased conditions resulting. Many invaluable sites have already been severely injured. These problems and various others dealing with park conditions are being studied in cooperation with the National Park Service and some of the State parks.



The incipient chestnut-orchard industry in the East was wiped out by chestnut blight. Blight-resistant strains of chestnut introduced by this Bureau are being extensively tested as a basis for an orchard industry. Among many thousands of seedlings, those in which resistance to the blight and root disease are combined with desirable horticultural qualities are being selected. Extensive breeding work to secure valuable hybrids is under way. As we normally import 20 to 25 million pounds of chestnuts from Europe, this is an agricultural industry that can be developed without danger of overproduction for many years. In the Western States, where the blight is not yet established, most of the planted chestnuts are blight susceptible, and efforts are being made to eradicate the few infections already found in that region and to put the industry on a basis of blight-resistant trees. (National Park Service cooperating.)

3. Epidemic Tree Diseases.--This project covers the investigation of threatening diseases of forest and shade trees and those recently discovered in the United States. Knowledge of the causal agents and their behavior and the discovery of control methods may at that time make possible the ridding of the country of these diseases before they become established. The work must meet emergencies as they arise. The Dutch elm disease, discovered in a small way in 1930 in Ohio and more recently in Maryland, Virginia, West Virginia, Indiana, and Pennsylvania, is now very serious around New York City, in New Jersey, New York, and Connecticut, where thousands of affected trees have been found. It threatens the life of the American elm. The investigations made under this project furnish the foundation for the joint Federal and State eradication campaign now under way. The European larch canker infection found in Massachusetts is important to the larch forests of the Northern and Western States. The cause and control of a canker disease of pitch pines is being studied. A needle fungus has recently caused great destruction of Douglas fir in Europe and studies have been started on related fungi recently found in this country. The twig blight of the ponderosa pine in Arizona and New Mexico is being evaluated. Epidemic dying of sycamore in Philadelphia, Baltimore, and New Orleans has caused much concern among city foresters. Willow scab has spread over New England and southwesterly through New York and Pennsylvania and has recently been found in the mountains of North Carolina. This disease has an important potential bearing on the use of willows in erosion control. A killing disease of the wild persimmon in Tennessee is being investigated. The American persimmon is important in erosion control. (Bureau of Entomology and Plant Quarantine cooperating.)





## (1) FRUIT AND VEGETABLE CROPS AND DISEASES

|  |                  |
|--|------------------|
| Appropriation Act, 1939.....   | \$1,289,182      |
| Allotment for transfer in 1940 Estimates from<br>"Seed Investigations" (incident to transfer<br>of regulatory work under that item to the<br>Agricultural Marketing Service..... | + 7,800          |
| Total available, 1939.....   | 1,296,982        |
| Budget Estimate, 1940.....   | <u>1,296,982</u> |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| 1. Deciduous fruit investigations....   | \$285,409 | \$282,182           | \$282,182           |
| 2. Citrus, avocado, and other sub-<br>tropical fruit investigations.....  | 108,703   | 107,755             | 107,755             |
| 3. Nut investigations.....  | 120,958   | 239,524             | 239,524             |
| 4. Vegetable investigations.....  | 234,183   | 231,732             | 231,732             |
| 5. Floricultural and ornamental<br>horticultural plant investigations.  | 72,737    | 71,961              | 71,961              |
| 6. Nursery stock and farm windbreak<br>investigations.....  | 66,802    | 66,848              | 66,848              |
| 7. Potato investigations.....   | 78,072    | 87,223              | 87,223              |
| 8. Methods of handling, transportation<br>and storage, and market diseases<br>of fruits, vegetables, and flowers,<br>Investigations of..... | 168,366   | 166,443             | 166,443             |
| 9. Investigations of variety suit-<br>ability and quality in relation to<br>fruit and vegetable utilization....                             | 43,857    | 43,314              | 43,314              |
| Transferred to "Dry-Land Agriculture"<br>for regrassing investigations.....   | 7,115     | - - -               | - - -               |
| Unobligated balance.....  | 1,080     | - - -               | - - -               |
|   | (a)       | (a)                 |                     |
| Total appropriation.....  | 1,187,282 | 1,296,982           | 1,296,982           |

(a) Amounts for 1938 and 1939 include allotment of \$7,800 as set forth in first table above (transferred in Estimates for 1940).

## WORK UNDER THIS APPROPRIATION

General.--Under this appropriation investigations are conducted to determine the best methods of culture under different environmental conditions, also methods of propagation, breeding, selection, production of high-quality orchard fruits, small fruits, nuts, vegetables, ornamentals, nursery stocks, and related plants. The interrelation of various orchard-management practices and problems concerned with the nutrition and physiology of the various horti-



cultural plants are studied. Investigations for determining the proper stage of maturity and the best methods of harvesting, packing, shipping, and storing horticultural products are conducted, including studies of the physiological and related changes in perishables during storage and marketing. Suitability of different horticultural varieties for the making of by-products is determined. In addition to cooperative activities with the State agricultural experiment stations, other bureaus of the Department of Agriculture, and the Bureau of Indian Affairs of the Department of the Interior, investigations are carried on at field stations, laboratories, and offices at the following points;

Field Stations (Government-owned land)

|                                |                       |
|--------------------------------|-----------------------|
| Beltsville, Maryland           | Indio, California     |
| Brownwood, Texas (long lease)  | Meridian, Mississippi |
| Charleston, South Carolina     | Oakville, California  |
| Cheyenne, Wyoming (long lease) | Robson, Louisiana     |
| Fresno, California             |                       |

Field Stations (land furnished)

|                       |                                     |
|-----------------------|-------------------------------------|
| Eustis, Florida       | Philema, Georgia                    |
| Fort Valley, Georgia  | Presque Isle, Maine                 |
| Greeley, Colorado     | La Jolla (Torrey Pines), California |
| Orlando, Florida      | Willard, North Carolina             |
| Palo Alto, California |                                     |

Field Laboratories

|                     |                     |                       |
|---------------------|---------------------|-----------------------|
| Albany, Georgia     | Logan, Utah         | Riverside, California |
| Austin, Texas       | Los Angeles, Calif. | Shreveport, Louisiana |
| Chicago, Illinois   | Madison, Wisconsin  | Columbia, Missouri    |
| Corvallis, Oregon   | Medford, Oregon     | Vincennes, Indiana    |
| East Wareham, Mass. | New York, N. Y.     | Wenatchee, Washington |
| Fayetteville, Ark.  | Pemberton, N. J.    | Yakima, Washington    |
| Hood River, Oregon  | Pomona, California  |                       |

Field Offices

Riverside, California

Sacramento, California

1. Deciduous Fruit Investigations.--These investigations cover production, breeding, and disease control for apples, pears, peaches, cherries, plums, apricots, grapes, raspberries, strawberries, cranberries, and other orchard and small fruits. The influence of pruning, fruit thinning, soil-improvement crops, fertilizers, and other orchard management practices on yield, regularity of crops, and quality of fruit is studied; also the functioning of fruit trees under varying soil moisture conditions. Cultural methods for strawberries, including effects of different plant nutrients on production, firmness, and quality of the fruit, are under investigation. The best root stocks and varieties for grapes in the Southeast and in the vinifera grape regions, especially in California, are being determined. Through fruit breeding and bud selection studies with apples, pears, peaches, plums, grapes, raspberries, strawberries,



cranberries, and other small fruits, improved varieties of high quality and disease resistance are being developed. Through introduction, breeding, and selection, fruit varieties are being developed that are adapted to withstand severe drought and cold conditions. Destructive fungous, bacterial, virus, and physiological diseases of all the more important kinds of deciduous fruits are studied for the purpose of determining their life histories, methods of dissemination, means of infection, and methods of control through spraying, disinfection, fumigation, eradication, breeding of resistant varieties, or other means. Efforts are made to develop new fungicides superior in effectiveness to those now generally in use and which will not cause injury to host plants. These investigations are designed to determine methods for reducing the cost of production and at the same time result in a more uniform and stable production of high-quality fruit.

Immense investments are represented by the apple and other deciduous fruit industries. The production of apples varies from around 120,000,000 to more than 200,000,000 bushels annually, with a valuation ranging from less than \$100,000,000 to nearly \$120,000,000, depending on crop and market conditions. The annual valuation of the peach crop formerly averaged around \$60,000,000, though in recent years it has ranged from about \$36,000,000 to around \$50,000,000. The grape crop in recent years has varied in annual value from about \$35,000,000 to more than \$50,000,000. In former years the average was considerably greater. The strawberry crop in normal years has a farm value of \$35,000,000 to \$38,000,000. The farm value of the other deciduous fruits adds many more millions of dollars to the total. Annual losses due to the more prevalent fruit diseases have been estimated at about \$50,000,000. Disastrously large proportions of fruit crops are frequently lost by growers, from disease and other causes potentially preventable, their income being reduced proportionately. The development and use of suitable disease control methods would largely prevent many such losses and aid greatly in stabilizing annual crop production - a factor of basic importance to the grower and consumer alike and to the fruit industry generally. One of the most serious handicaps of the fruit grower is the wide fluctuation from year to year in the size of the crop and its cash return. The orchard management studies are projected with a view to inducing regular annual crops of high quality. Specific methods, often quite different, must be developed because of the different regional conditions under which fruit is grown. Most fruit varieties in cultivation originated as chance seedlings; practically all of them are faulty in various ways. Fruit breeding is conducted to develop disease-resistant varieties having better eating quality, better adapted to various local conditions, and possessing superior merit for shipping, storing, canning, drying, or preservation by other methods. The bud-selection work accomplishes similar results by taking advantage of bud mutations as they occur in nature. These lines of investigation are for the purpose of aiding fruit growers in the solution of problems which seriously reduce net income and which as individuals they are not in a position to solve.

2. Citrus, Avocado, and Other Subtropical Fruit Investigations.--Efforts are being made through breeding and bud-selection methods to develop improved citrus varieties resistant to disease and capable of producing more regular and profitable yields. More satisfactory understocks are being sought, and the effects of tree pruning, soil management, fertilization, and leaf area on the





yield, texture, storage, and shipping quality are being determined. Special attention is being given to all production problems concerned in growing Satsuma oranges in the Gulf States. Variety studies, studies of pollination, pruning, and soil-management requirements, breeding and propagation investigations, and studies of factors affecting quality are being conducted with dates, avocados, mangos, figs, and other subtropical fruits. Diseases of citrus and other subtropical fruits are studied to determine their causes, methods of dissemination and infection, effects on the host plants, and the most effective and practical means of prevention or control.

For the years 1931-34 the average farm value of citrus fruits was about \$98,000,000. The corresponding figure for the years 1935 and 1936 was \$206,500,000. The average annual production of avocados for the 5-year period 1928 to 1932 was 2,156 tons, having an average farm value of \$518,000. In 1934, the production exceeded 11,000 tons, with a farm value of \$960,000; in 1935 the yield was 6,200 tons, but with the lighter yield and higher prices the farm value was even larger than in 1934; while in 1936, with about the same yield as in 1935, the farm value was considerably less than in 1935. The date crop amounts to about 7,000,000 pounds annually and is increasing. Similar figures for the mango and other subtropical fruits are not available. Certain of these fruits, such as the date, can be grown successfully in many of the hot interior valleys of the Southwest and will furnish a profitable crop for such regions when their cultural requirements are fully determined.

3. Nut Investigations.--The work under this project varies widely with the kind of nut and the region where grown. The merits of almond varieties are determined and improved varieties are being developed by breeding. Cultural requirements, including pollination problems of the pecan to induce regular annual crops of well-filled nuts, are being investigated. Habits of blossoming and pollination requirements of Persian walnut varieties as influencing yields are determined. The conditions most favorable to growth and production of filberts are being studied, also their cultural requirements. The merits, range of adaptability, and possibilities of black walnuts, various hickories, chestnuts, hazels, and other nuts are studied. The breeding and selection of improved varieties of filberts, walnuts, and other nuts are in progress. Diseases of pecans, walnuts, and filberts, which inflict heavy losses on the growers, are being studied to determine their life histories and modes of spread and development, and effective and economical methods of prevention or control are being worked out.

The research program relating to tung oil production, a new industry in this country, includes studies of the following factors: Range of adaptability with respect to climate and soil; cultural methods in their relation to the production of heavy and regular crops; pruning and training; pollination requirements; methods of propagation; breeding and selection to secure heavy producing varieties yielding nuts with high oil content and resistant to frost and other unfavorable conditions; diseases and their control.

The average production of almonds in California for 1933-35 was 10,300 tons, average value \$2,300,000; Persian walnuts, 42,000 tons, average value over \$3,200,000; and the value of filberts in Oregon ranged in 1931-34 from \$85,000 to \$300,000 a year. Pecans, representing the one native nut of primary



importance, averaged a yield of about 65,000,000 pounds for the years 1935 and 1936, with range in valuation of from nearly \$4,200,000 to \$6,000,000 per year. The value of nuts for food purposes is generally recognized. Serious production problems exist with each crop. Many almond varieties of inferior value have greatly handicapped merchandizing the crop. Varietal studies have helped to determine those to discard. The need of improved varieties has been partially met in breeding work that is in progress. The pecan has only comparatively recently been brought into cultivation in orchard form. Cultural requirements are largely undetermined. Irregular and small crops of poorly filled nuts are disastrously frequent. Cultural methods that will overcome these difficulties must be determined if the pecan industry is to succeed. Many Persian walnut orchards have habitually been unproductive. The determination of cross-pollination requirements of the varieties has shown that such orchards may be made more productive and profitable when suitable cross-pollination is provided. Widespread interest prevails in the various hickories, black walnuts, butternuts, hazels, and other nuts suitable for growing in Northeastern United States. Collections are being made throughout the country of as many desirable wild seedlings as can be found, and these should be grown under uniform conditions to determine the value from the standpoint of quick growth, disease resistance, and uniform yields of high-quality nuts. More than 100,000 acres of tung trees have been planted in recent years in the southern coastal plain region for the commercial production of tung oil, which is extensively used in varnish manufacture and for other industrial purposes, about 175,000,000 pounds of this oil having been imported in 1937.

4. Vegetable Investigations.--These activities include studies of improved methods of handling seed, production of plants in plant beds, and establishing field plantings; studies of the adaptability of specific crops and varieties to different regions as affected by water supply, temperature, and other meteorological factors; investigation of the causes and control of numerous nonparasitic diseases or abnormal growth and development troubles of vegetable crops; studies of fungous, virus, and bacterial diseases, their life histories, modes of dissemination and infection, and methods of control or prevention; of the factors determining high culinary and market quality in vegetable products and methods of their control; the breeding and selection of disease-resistant vegetable varieties of improved culinary and market quality to meet specific market, shipping and manufacturing requirements; and the establishment of nationally applicable standards and descriptions of commercially important varieties. Cultural, varietal, and breeding investigations are made in relation to the successful production of vegetable crops under the drought and low-temperature conditions of the Great Plains area. Breeding and selection investigations for disease resistance are being conducted with lettuce and muskmelon in California; tomatoes in Florida, Utah, and California; peas and beans in Colorado, Utah, and Oregon; and cabbage in Wisconsin. Breeding high-quality lettuce varieties adapted to the East is being done in New York, Massachusetts, and North Carolina; cultural and adaptation studies on sweetpotatoes, tomatoes, and asparagus in Mississippi; peanuts and sweetpotatoes in Virginia and South Carolina; special disease investigations on carrots, celery, and related crops in California; and on curly top of vegetables in Oregon, Washington, and Utah. Breeding work with the above named objectives for the Southeast and involving tomatoes, watermelons, beans, cabbage, and sweet corn is centered at the U. S. Regional Vegetable Breeding Laboratory at Charleston, S. C., in cooperation with the thirteen Southeastern States.





According to the 1930 census and data of the Department of Agriculture, the total farm value of the crops receiving consideration in this project was about \$800,000,000 in 1929. On account of low prices in the past few years, the total value of these crops is now far less. Losses from disease in the more important vegetables other than potatoes are estimated to amount to something like \$84,000,000 annually. Much of this loss could be prevented if more effective spray materials and spraying methods could be developed. If disease-resistant varieties of high quality could be developed by breeding, great savings would result. Vegetable disease control is basic to stabilized production.

5. Floricultural and Ornamental Horticultural Plant Investigations.--Experiments with tulips, daffodils, lilies, and other bulbous flowering plants are conducted. The work includes a study of fertilizers and other agricultural methods and the effects of different storage conditions and handling methods on subsequent growth and flowering, the object being to regulate at will the time of flowering by appropriate treatment. Breeding and selection to develop improved types and varieties is also under way. Investigations of the anatomy and growth of tulips and narcissus are also being conducted in order to intelligently plan for fertilizer and storage experiments. The method and time of fertilizer application on narcissus is being studied. Breeding work on annual and perennial flowers is under way. The inheritance of certain important economic characters is being worked out so they may be combined with desirable characters from other varieties or species. Some of these characters are flower doubleness, color, size, plant habit, and time of bloom. As a result of this work the Department has already introduced twelve early-blooming winter-hardy chrysanthemums. The problem of the double-flowered stock is also being investigated. This plant produces both single and double-flowered plants, the former being of little economic value. A method has been developed whereby double-flowered plants may be selected from seedlings with an accuracy of 95 percent. Investigations are conducted on important diseases of roses, azaleas, boxwood, and other ornamental shrubs, florists' stocks, and flowering bulbs, with a view to determining the cause, means of spread, conditions influencing outbreaks, and methods of satisfactory control or prevention.

The main object of bulb culture investigations is to develop information needed by producers of bulbs in this country. The production of "Dutch" bulbs is an important industry and most American planters are now using domestic rather than imported bulbs. In 1929 there were imported into this country 235,000,000 to 250,000,000 bulbs, including hyacinths, tulips, daffodils, crocus, lily, and other commonly grown stocks. The value was nearly \$7,000,000. In 1932 the importation of the same items was 140,000,000 to 150,000,000 bulbs, with a value of about \$2,260,000. Many American growers, largely as a result of these investigations, are now producing supplies of bulbs formerly imported. In these investigations methods are being developed that greatly simplify cultural practices and reduce cost of production. By use of special methods of storing and handling, practices are being originated so that florists may secure blossoms of iris and daffodils several weeks in advance of the usual time of blooming and at periods when good demand for them can readily be developed. This greatly extends the "forcing season" for these items and at little or no added expense to the growers. More than 100 lily progenies from breeding work are being developed. Several lily hybrid selections of





much promise and representing new types have been introduced. Investigations on Easter lilies include studies of forcing, propagation, breeding, and diseases. At the present time practically all the Easter lilies now used in this country are imported from Japan and Bermuda. The work so far accomplished indicates, however, that a supply of good healthy bulbs can be grown in this country, but further studies on this project are needed.

With the expanding interest in recent years in the growing of ornamental plants, disease problems began to multiply, with corresponding demands made on the Department for help. Because of the universal interest in an extensive planting of roses and the seriousness of certain diseases, attention has been directed to certain ones with a view to finding effective and practicable means of control. A similar situation prevails with respect to bulbs, lilies, and other ornamental plantings. The work is directed to particular disease troubles that cause serious loss to the producers of particular kinds of florists' and ornamental stocks as well as to the purchasers and planters. There are no complete figures available on the losses due to the diseases of ornamental plants. An estimate has been made of \$2,500,000 annually due to diseases of greenhouse roses alone.

The investigation of an azalea flower spot disease, now widespread in the South, has shown it to be caused by a hitherto unrecognized disease. The overwintering stage has now been found and investigations on control methods are under way.

The 1930 census report shows that in 1929 nursery sales included about 110,000,000 specimens of ornamental trees, shrubs, and other similar plants (not counting annuals, bulbs, and herbaceous plants). On April 1, 1930, there were growing in nurseries of the United States, for further development and future sale, about 340,000,000 specimens of the same items. The sales of florists' stocks, roses, carnations, and the like, grown in greenhouses and in the open during 1929, amounted to more than \$98,000,000. The study of this type of material to determine the varietal merit and effectiveness and adaptability to different conditions and uses is necessary in order to supply information constantly and increasingly in demand by the public, also to determine the best methods of culture, including pruning, fertilizing, and general care. The development by selection of improved varieties, particularly of hardy chrysanthemums, to provide early and desirable flowering types for regions where the growing season is comparatively short, is yielding results of large potential importance.

6. Nursery Stock and Farm Windbreak Investigations.--This work consists of selecting and determining the merits from the point of view of both nurseryman and fruit grower of different understocks for use in propagating apple, pear, peach, plum, and cherry trees. Suitable vigorous and disease-resistant stocks for outdoor hybrid tea roses and for use in propagating rose plants for greenhouse forcing are being studied. Studies are being made of the propagation of other ornamentals, including also the propagation of fruit and rose stocks from seed, and by grafting, layering, and cuttings. These investigations are made with the aim of more efficient production of these plant materials by reducing hazards often experienced under present conditions and methods employed.



Experiments are being made on the proper storage of nursery stock to determine optimum moisture and temperature conditions for best results. Investigations are made of crown gall and other diseases of nursery stock and of various root diseases of fruit trees, with a view to determining their cause, the factors influencing their development, and the best means of prevention or control. In the limitations of present knowledge, the finding or development by breeding of understocks resistant to these root-rot diseases appear to offer about the only solution of this problem. Investigations are made relative to the best species of trees to use for windbreaks, both under dry and irrigated conditions, in the Great Plains area, the best methods of planting and tree arrangement from the standpoint of checking wind velocity and snow drift, and the relation of the windbreak to the prevention of soil blowing and the retention of moisture.

According to the 1930 census report, nursery sales during 1929 involved approximately 186,000,000 trees, shrubs, and other plants (excluding strawberry and other berry plants). As of April 1, 1930, the nurserymen had growing for further development and future sales nearly 490,000,000 of the same items. The value of the sales in 1929 amounted to about \$95,000,000. Relatively little research work for the benefit of the nursery industry has been done in this country. Many of the problems concerning suitable understocks, methods of propagation, and the winter storage of nursery stock remain unsolved. An understock may lack hardiness or congeniality with the variety grafted on it, or it may lack insect or disease resistance, or adaptability to soil conditions, or other qualities necessary to make it of permanent value to the planter. Heavy losses to both nurserymen and fruit growers have occurred in the past from the use of unsuitable understocks. More rapid, less tedious, and less costly methods of propagating certain kinds of stock are needed. Heavy losses from the destructive effects of improper storage conditions during winter are often suffered. Research on storage conditions for optimum results should save many thousands of dollars in such losses. Improvements in methods of disease control will prevent large losses and have a stabilizing effect on the industry. The best selection and proper arrangement of trees for wind-break planting in the Great Plains area should result in better conservation of soil moisture through lessening the effects of drying winds; in the better distribution of soil moisture by preventing the drifting of snow in the winter; in preventing the distortion of fruit trees and other vegetation by breaking the force of strongly prevailing winds; in preventing wind erosion of the soil; and, in general, in creating more pleasant surroundings in which to live and a more profitable agriculture.

7. Potato Investigations.--These investigations fall mainly into three groups; (1) Breeding and selection to develop new varieties that possess superior table quality, better adaptability to diverse soil, climatic, and other conditions, and resistance to disease; (2) cultural methods, including storing and handling of seed stocks to obtain optimum results; and (3) studies of the fungous, bacterial, virus, and physiological diseases of potatoes, their causes, means of spread, effects on the plant, conditions influencing outbreaks, and methods of control or prevention. Breeding and selection work aimed at the development of superior varieties having either a regional or a wide range of adaptability is carried on cooperatively between this Bureau and sixteen States and one territory, viz., California, Colorado, New York (Cornell University), Idaho, Iowa, Louisiana, Maine, Michigan, Minnesota,





Nebraska, North Carolina, North Dakota, Oregon, Rhode Island, Utah, Washington, and Hawaii. Similar cooperation in Wisconsin, Ohio, and other States is definitely in prospect. Such cooperation provides for substantially a nationwide test of the promising selections resulting from the breeding work. Cultural investigations are conducted to determine the most profitable quantity of seed to use; time of cutting seed and manner of handling thereafter; best methods of planting; most efficient use of fertilizers; amount of irrigation necessary in different regions; and effect on results of storing seed stocks at different temperatures and humidities.

The average farm value of the potato crop for the five years 1931-35 was about \$193,500,000. In recent years the annual farm value of the crop has ranged from about \$120,000,000 to more than double this figure depending on the size of the crop and market conditions. The potato crop is vastly important to the farmer; it is the most important vegetable crop to the consumer based on volume used. Though extensive commercial production is restricted to perhaps a dozen States, the potato is the most universally grown of all vegetable crops. Problems of production are as varied as the diverse conditions under which the crop is grown. Low yields per unit of land prevail generally. Stabilization of production through greatly increased yields per unit of land, thus reducing acreage and lessening costs of production; better handling of seed stocks; and the development of varieties of superior quality and resistant to disease are some of the principal means of bettering the potato industry, particularly the producer. The estimated loss from potato diseases is about \$45,000,000 annually, and any improvement in efficiency or economy of control measures would result in large financial savings. On the basis of present knowledge, the development by breeding of disease-resistant varieties offers the only hope of preventing much of this loss.

8. Investigations of Methods of Handling, Transportation, and Storage, and Market Diseases of Fruits, Vegetables, and Flowers.--Experiments are conducted to determine the most effective methods of precooling and refrigerating fruits and vegetables in transit; best methods of car heating to prevent freezing while in transit during extremely cold weather; methods of controlling diseases of fruits and vegetables in transit, in storage, and while on the market; also the effect of ethylene and other gases in degreening or ripening fruits and vegetables; and of gas treatments prior to or during storage as a supplement to or substitute for cold storage. Methods of removing spray residues are investigated. Studies have been made of storage conditions, especially relating to temperature, humidity, duration of storage period, and ripening conditions after removal, which produce optimum results for canning, fresh fruit utilization, or for other purposes. As a result, some products of excellent quality have been obtained from types of fruit previously supposed to be unpromising for the purpose. Various other problems relating to handling, transporting, and storing perishable products are receiving attention.

Losses of fruits and vegetables which occur in transit, in storage, and on the market as a result of disease, freezing in transit, or other conditions adverse to the product total many millions of dollars annually. Investigations under this project have resulted in the development of methods for reducing or controlling many of these losses. In the case of Florida citrus fruit, the studies have shown how stem end rot can be cut from 40-50 percent to 5-10 per-





cent, which means a saving of upwards of \$200,000 annually. Investigations that include the history and condition of the fruit when shipped or stored, and the temperature and other conditions during transit by rail, boat, or other means, and during storage and marketing periods, are essential to get at the facts needed in correlating cause and effect. The development of improved and economical methods of precooling and transit refrigeration in this phase of the Bureau's recent investigations is estimated to yield a direct annual saving of over \$1,000,000 to the California orange industry and as much or more to the pear industry of the Pacific Coast.

The removal of spray residues necessary to bring these products within legal requirements of tolerance has presented complicated problems that are entirely beyond the facilities and ability of growers and shippers to solve for themselves. In regions where heavy spraying of apples and pears is necessary to control insects, as in the Pacific Northwest and certain districts of the Eastern States, it can be said that the investigations on this problem have been largely responsible for the preservation of the industry, due to the development of safe methods of washing these products with chemical solvents. The use of ethylene and other gases in treating citrus fruits for the purpose of eliminating the green color in fruit that is commercially mature requires research to determine the limit of usefulness of the process, methods of application, effect on the fruit, and other like factors, so that the growers, shippers, and the industry generally may take full advantage of its beneficial possibilities. The working out of storage and ripening details in handling Kieffer and other pears of the same type, that result in a greatly improved quality of fruit for canning and other purposes, should add very materially to the value of a type of fruit grown extensively and widely and which heretofore has had a relatively small value, in part because of its poor eating quality. These and other lines of investigations have aided and are continuing to aid very greatly in the handling of perishable products.

9. Investigations of Variety, Suitability and Quality in Relation to Fruit and Vegetable Utilization.---This work includes the study of horticultural varieties of fruit and vegetables in relation to their suitability for various methods of processing and manufacture to determine what varietal characteristics influence the appearance, palatability, and food value of the product, with a view to developing by breeding and selection improved types that will furnish superior products; to study, in the case of a particular variety, the effect of varying storage and environmental conditions and cultural practices on its suitability for processing, on the quality of the product, and on the composition of the raw and processed product; and to conduct such physiological and related biophysical and biochemical studies as are necessary to determine differences in the suitability of the crop materials for processing and in the quality of the products.

The best figures available are those in the Census of Manufactures, 1933, and which give the aggregate value of "canned and processed vegetables and fruits and pickles, preserves, jams, jellies, and sauces, all industries", for 1929 as \$831,191,000. The corresponding figure for 1931 is \$555,355,000, and for 1933 it is \$480,548,000. The decrease shown by these figures is chiefly one of prices rather than of volume of material packed. Even in seasons of comparatively light packs the quantity of fruit and vegetable



products preserved by canning, freezing, and in other ways is impressive. Experience in the past has shown that improvement in appearance and quality of the pack increases consumer demand and widens the markets for such products, with consequent benefit to the growers of the raw materials. Varietal character, stage of maturity, and factors of growth have a direct bearing on the appearance, palatability, and food value of the preserved products. The most profitable utilization of fruits and vegetables must be based on the suitability of different varieties for the particular methods of processing or manufacture.

(m) GENETICS AND BIOPHYSICS

Appropriation Act, 1939..... \$31,675  
 Budget Estimate, 1940..... 31,675

PROJECT STATEMENT

| Projects                                    | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| Genetics and biophysics investigations..... | \$30,475 | \$31,675            | \$31,675            |
| Unobligated balance.....                    | 1,200    | - - -               | - - -               |
| Total appropriation.....                    | 31,675   | 31,675              | 31,675              |

WORK UNDER THIS APPROPRIATION

The work under this appropriation includes studies (chiefly with corn and its wild relatives) of the mechanism of inheritance, by which plant characters are transmitted from one generation to the next; exploration of the possibilities of inducing new characters by various kinds of radiation, such as X-rays, heat, and light; and investigation of the possibility of influencing the growth of plants by modifying certain elements of the environment, with special reference to X-rays and to light of specified wave lengths or colors. The investigations are carried on in the laboratory and at field stations operated by other divisions of the Bureau.

The justification for this work lies in the importance of a thorough knowledge of the mode and the mechanism of inheritance as a guide to the improvement of plants by breeding, of producing entirely new forms of plants that might have useful characters, and of determining the action on plant growth of electrical, photoelectrical, and other radiations. The results achieved in previous years have made valuable contributions to a knowledge of heredity of importance to an understanding of plant breeding. Results have been obtained on the effect of light of different wave lengths on the growth of corn and other seedlings.



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## (n) IRRIGATION AGRICULTURE

(Formerly "Western Irrigation Agriculture").

|   |           |
|---|-----------|
| Appropriation Act, 1939.....  | \$120,327 |
| Allotment for transfer in 1940 Estimates<br>(incident to merger hereunder of farm<br>irrigation work transferred from "Agricul-<br>tural Engineering Investigations, Bureau<br>of Agricultural Engineering")..... | +32,347   |
| Total available, 1939.....  | 152,674   |
| Budget Estimate, 1940.....  | 152,674   |

## PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| 1. Crop production investigations<br>under irrigation.....                  | \$121,639 | \$122,077           | \$122,077           |
| 2. Quality of irrigation and<br>drainage waters.....                        | 31,795    | 30,597              | 30,597              |
| Transferred to "Dry-Land Agriculture"<br>for regrassing investigations..... | 715       | - - -               | - - -               |
| Unobligated balance.....  | 725       | - - -               | - - -               |
|   | (a)       | (a)                 |                     |
| Total appropriation.....  | 154,874   | 152,674             | 152,674             |

(a) Amounts for 1938 and 1939 include allotment of \$32,347 as set forth in first table above (transferred in Estimates for 1940).

## CHANGES IN LANGUAGE

It is recommended that the language of this paragraph be amended to read as follows:

[Western irrigation] Irrigation agriculture: For investigations [in connection with western irrigation agriculture, the utilization of lands reclaimed under the Reclamation Act, and other areas in the arid and semi-arid regions, \$120,327] of crop production on irrigable lands, the quality of irrigation water and its use by crops, and methods for improving and maintaining the productivity of irrigated soils, \$152,674.

These changes are suggested in order to specifically describe the irrigation activities which will be under way in the Bureau of Plant Industry under the proposal in these Estimates to merge with this item farm irrigation work now being conducted under the Bureau of Agricultural Engineering. Broadening of the title of the appropriation (from "Western irrigation agriculture"

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) and (2) under the assumption that the functions  $f_i(x)$  and  $g_j(x)$  are continuous and satisfy certain conditions. The main result of this part is the theorem of existence and uniqueness of solutions.

2. In the second part, the problem of the stability of solutions is considered. It is shown that the solutions of the system (1) and (2) are stable with respect to the initial conditions if the functions  $f_i(x)$  and  $g_j(x)$  satisfy certain conditions.

3. In the third part, the problem of the asymptotic stability of solutions is considered. It is shown that the solutions of the system (1) and (2) are asymptotically stable with respect to the initial conditions if the functions  $f_i(x)$  and  $g_j(x)$  satisfy certain conditions.

4. In the fourth part, the problem of the boundedness of solutions is considered. It is shown that the solutions of the system (1) and (2) are bounded with respect to the initial conditions if the functions  $f_i(x)$  and  $g_j(x)$  satisfy certain conditions.

5. In the fifth part, the problem of the periodicity of solutions is considered. It is shown that the solutions of the system (1) and (2) are periodic with respect to the initial conditions if the functions  $f_i(x)$  and  $g_j(x)$  satisfy certain conditions.



to "Irrigation agriculture") is also proposed, in order to cover irrigation work hitherto conducted by the Bureau of Agricultural Engineering in eastern and central portions of the United States.

#### WORK UNDER THIS APPROPRIATION

General.--Under this appropriation the Bureau of Plant Industry is conducting investigations, independently and in cooperation with State experiment stations and other agencies and with other bureaus and departments of the Government, in the irrigated areas of the United States to determine what crops, what crop rotations, and what irrigation methods are best suited to the several regions, what constituents and concentrations of salts in irrigation and subsoil waters are injurious to crops, and how such injury may be minimized or prevented.

1. Crop Production Investigations under Irrigation.--The work under this project is carried on at field stations of the Bureau and in cooperation with State agricultural experiment stations and with private growers. The work consists of investigations with field, vegetable, and fruit crops; an extensive series of crop rotation experiments; and investigations of irrigation methods, of the water requirements of crops, and of the use of manures and fertilizers as a means of maintaining crop yields. The fundamental objective of these investigations and experiments is to determine what methods of irrigation, crop production, and crop utilization on the farm are best adapted to the maintenance of a permanently successful irrigated agriculture.

2. Quality of Irrigation and Drainage Waters.--The work under this project is conducted at field laboratories--one at Riverside, California, and one at Fallon, Nevada--and in cooperation with the States, with the Bureau of Reclamation, the Geological Survey, the International Boundary Commission (United States and Mexico), and with various irrigation districts. The investigational work consists of collecting and analyzing samples of irrigation, drainage, and underground waters to determine what constituents and what concentrations of these constituents are causing crop injury or impairing the physical conditions of the soil, to determine the sources of the contamination of irrigation supplies with such highly injurious substances as the compounds of boron and chlorine, and to devise ways of minimizing or preventing such contamination. The fundamental objective of these investigations is to find ways and means of preventing the injury that may occur in irrigated areas through the accumulation of excessive subsoil water or of soluble salts in the soil.



## (c) MYCOLOGY AND DISEASE SURVEY

Appropriation Act, 1939 ..... \$45,818  
 Budget Estimate, 1940..... 45,818

## PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. Investigations, identification,<br>and collection of fungi..... | \$15,971 | \$16,029            | \$16,029            |
| 2. Plant disease survey.....                                       | 22,133   | 22,263              | 22,263              |
| 3. Mushroom investigations.....                                    | 7,487    | 7,526               | 7,526               |
| Unobligated balance.....   | 227      | - - -               | - - -               |
| Total appropriation.....   | 45,818   | 45,818              | 45,818              |

## WORK UNDER THIS APPROPRIATION

General.--Research under this appropriation includes the collection and study of plant parasites and other fungi, surveys of plant diseases in the United States, and investigations on the culture and diseases of mushrooms.

1. Investigations, Identification, and Collection of Fungi.--This project is concerned with the identification of fungi of all groups for Federal and State workers, students, teachers, and the general public; with supplying information on fungi to those interested; with the preparation of detailed studies of various fungus groups as a basis for routine identifications; and with the upbuilding and maintenance of a representative collection of the fungi of the world for reference and study purposes. Special problems include the study of fungi attacking insects, of poisonous and edible field and forest mushrooms, and of parasites of destructive fungi, as well as the comprehensive indexing of the literature on plant diseases and fungi in general, in cooperation with the Plant Disease Survey. A fungus exchange service is maintained both as a means for securing new and valuable materials for the national collection and to supply workers in the State experiment stations and elsewhere with specimens needed for research or instructional work.

This project operates as a national service unit along the above lines, and the extent of the identifications made and the number of responses to requests for fungus information supplied reach a total limited only by the size of the staff. The fungus collection now totals nearly 400,000 specimens, with supplementary collections of photographs, microscopic preparations, and necessary covering indexes, and is one of the largest and most comprehensive of its kind in the world.



2. Plant Disease Survey.--Work under this project consists of collecting by means of surveys and through cooperation with State institutions and other agencies current information as to the occurrence, prevalence, rate of spread, and seasonal and geographical distribution of plant diseases in the United States, and the losses caused by them, as well as to the appearance of new and dangerous diseases or epidemics and unusual outbreaks of diseases. Files are maintained in which the information in permanent and accessible form is always available to plant pathologists and economists and others to whom they are of value. In cooperation with the Mycology projects, a file of plant disease literature of the world is maintained. By means of a mimeographed periodical, current information on the status of plant diseases in the United States is distributed to plant pathologists in this country and abroad.

The work of this project is all national or broadly regional in scope. It is noncompetitive and is organized on the basis of cooperation with and services to the State and Federal workers in the field of its activity. It functions as a clearing house for information on plant diseases and is the only agency in the country which attempts to study the significance of plant diseases and the factors which regulate outbreaks on a national basis. The service assists in predicting the appearance of new and dangerous epidemics and furnishes information necessary to prevent outbreaks. More than 150 State experiment station workers from every State in the Union are included in the list of voluntary official collaborators served by the Survey, whose reports are recorded, preserved, summarized, and distributed to interested persons and agencies currently through the project's periodical and privately through correspondence or the courtesy of the files as the occasion may arise.

3. Mushroom Investigations.--This project is concerned at present with improvements in cultural practices and sanitary procedure in mushroom houses; with studies in the life history, behavior, and control of the "truffle" disease and other destructive mushroom troubles; with the development of new noncompetitive mushroom industries through work to establish in the United States cultivation of the European truffle and the Japanese mushroom and to grow under artificial conditions the Morel and other desirable wild types; and with studies to establish fundamental principles in the physiology and genetics of mushrooms and the interrelation of aeration, temperature, and other factors in mushroom compost heaps and related problems as direct aids to the industry.

The mushroom industry of the United States represents a capital investment of approximately \$15,000,000, with annual gross receipts from mushroom products of about \$5,000,000. In close connection with the industry, this project has developed improved cultural practices and disease-control methods so as to lower production costs. It is also concerned with the development of similar industries through cultivation of other edible fungi (i. e., the truffle a \$6,000,000 industry in France). Popular interest is shown by the supplying, upon request, in a single year of over 50,000 copies of publications on mushroom culture and diseases. Other definite results have been the development of an artificial compost to replace horse manure when necessary, and the control of the "bubbles" disease.





## (p) NATIONAL ARBORETUM

Appropriation Act, 1939..... \$54,587  
 Budget Estimate, 1940..... 54,587

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| 1. Maintenance and operation of<br>Arboretum.....                           | \$26,748 | \$27,000            | \$27,000            |
| 2. Planning, developing and<br>construction of Arboretum.....               | 94,951   | 27,587              | 27,587              |
| Transferred to "Dry-Land Agriculture"<br>for regressing investigations..... | 235      | - - -               | - - -               |
| Unobligated balance.....  | 66       | - - -               | - - -               |
| Total appropriation.....  | 122,000  | 54,587              | 54,587              |

## WORK UNDER THIS APPROPRIATION

The National Arboretum was authorized by Congress in an Act approved March 4, 1927 (20 U.S.C. 191-194) for research and education concerning tree and plant life. A total of 385 acres has been purchased and present plans call for the purchase of additional land. The Arboretum in its final development will contain living examples of all species of woody plants suited to outdoor cultivation in this region that will furnish the basis for breeding studies with woody plants and ecological studies, as well as botanical work. It will provide also such library, herbarium, office, greenhouse, and nursery facilities as may be needed to carry out the scientific studies. Under this appropriation routine maintenance operations are conducted on the National Arboretum. A large amount of land still remains to be cleared, and the land already cleared should be prepared for planting. Collection of material now on the ground must be maintained and prepared for planting to prevent their total loss. A nursery for the development of plants for the permanent collections has been developed but is not yet large enough. With the purchase of additional land provided for in 1938, the opening of other areas for nursery plantings will be undertaken. This appropriation covers only bare maintenance of limited propagation work and physical improvements made in the past four years; it does not permit progress on plans for substantial development.



## (q) NEMATODOLOGY

Appropriation Act, 1939..... \$48,961  
 Budget Estimate, 1940..... 48,961

## PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. Plant parasitic and related<br>nematode investigations.....                     | \$46,677 | \$46,761            | \$46,761            |
| 2. Investigations on nemic<br>parasites of insects and other<br>invertebrates..... | 2,200    | 2,200               | 2,200               |
| Unobligated balance.....   | 84       | - - -               | - - -               |
| Total appropriation.....   | 48,961   | 48,961              | 48,961              |

## WORK UNDER THIS APPROPRIATION

General.--It is widely known that parasitic nematodes or threadworms are the cause of numerous diseases in man and domesticated animals (hookworm, Ascaris, Trichina, etc.). It is not often realized, however, that numerous nematode species also parasitize lower animals (such as insects, millipeds, spiders, snails, etc.) or prey on plants (living in or on their roots, stems, leaves, flowers, or seeds) or live more or less free (thousands of species) in the soil and in fresh and marine waters. These nematodes, most often invisible to the naked eye because of their small size, interfere in many ways with human activities. They are the cause of some of the worst crop diseases, such as root-knot, which today is known to affect some 1,200 different kinds of plants, including a large portion of our most valuable crops (cotton, tobacco, Irish potatoes, sweetpotatoes, tomatoes, lettuce, peach trees, grape vines, etc.) and ornamental plants - even various forest trees. There is the so-called sugar-beet nematode, a very dreaded pest, which attacks some 200 different hosts, formerly known mainly as the cause of "beet tiredness" or "beet sickness" of the soil but recently the subject of very drastic measures in various potato-growing regions of Sweden, Great Britain, and Germany. Then, there may be mentioned the bulb or stem nematode, a species also known to attack some 250 different host plants and in some cases very detrimentally, e.g., narcissus bulbs, alfalfa, clover, sweetpotatoes, and Irish potatoes. Another form, the strawberry nematode, is principally known as the causative agent of the strawberry dwarf or crimp but also attacks a wide variety of plants, especially ornamentals such as begonias, ferns, and chrysanthemums. Other outstanding nematode pests of plants are the wheat nematode (the cause of cockle ears), the citrus nematode, the meadow nematode, the burrowing nematode (mostly on tropical and subtropical plants like sugarcane, coffee trees, etc.), and numerous forms which are less important or little known at present.

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The insect-parasitic nematodes are thought to be one of nature's means of keeping insect and similar pests in control. In regions where grasshoppers never develop into damaging swarms, it is thought that parasitic nematodes of the group known as mermithids (sometimes called "hairworms" or "horsehair snakes") are the main natural controlling factor. These mermithids, however, require certain climatic and moisture conditions for their proper development and are therefore unable to exist in the semiarid regions where grasshopper plagues regularly occur.

Work of this character is of a highly specialized type, necessitating detailed training for the investigator. There are few such specialists, so that most State and private agencies must rely on the Division of Nematology as the sole agency from which to obtain information as to the possibility that a given disease may be caused by nematodes and advice as to procedure and control.

1. Plant Parasitic and Related Nematode Investigations.--Each year activities under this project cover the examination and correspondence relating to six to eight hundred samples of plant and soil material and numerous inquiries pertaining to nematode diseases of plants and the significance of soil-inhabiting forms for crop production and soil fertility. Such problems are presented as the significance of forms found in deteriorating lumber, or in freshwater filter beds, or in vinegar, or in animal skins during the tanning process, etc. Planned research activities comprise investigations into the life habits and development of the following plant parasitic forms: Root-knot nematode, sugar-beet nematode, bulb and stem nematode, and strawberry nematode. The following control methods are being investigated: Crop rotation for the various nematode pests and its regional application; cultural control such as early planting, frequent cultivation, submersion, and fallowing; soaking and testing nematode-resistant crop plants and ornamentals; selecting resistant varieties of susceptible crops; testing chemical and other soil-disinfection methods; and developing therapeutical methods to cure infested plants by killing the nematodes without harming the plants through hot water, vapor heat, vacuum treatment, or chemical therapeutics (iodine, etc.).

To estimate the savings resulting from these activities is difficult. They touch home gardens as well as large-scale crop production and cover items such as these: A truck gardener is informed how to again grow healthy carrots instead of his knotted, unmarketable, root-knot-infested crop; a greenhouse man is told how his unmarketable, leafless begonias can be cured by controlling the strawberry nematode; a real-estate company is informed how by proper procedure they may avoid further losses to shade trees affected by nematodes in their city development. The yearly savings through the activities under this project amount certainly to more than ten times the amount of the whole appropriation.

2. Investigations on Nemic Parasites of Insects and Other Invertebrates.--Activities under this project include the examination of and correspondence relating to some fifty to eighty sample collections of nematodes parasitic in lower animals, such as snails, earthworms, and insects (barkbeetles, Japanese beetle, mosquitoes, gypsy moth, grasshoppers, etc.). Such collections are submitted for information regarding the possible significance of the parasites as





natural enemies of these pests. Investigations on the taxonomy, life history, and economic significance of the mermithids (forms known particularly as grasshopper parasites) are now being prepared for publication.

Colonization of mermithids to control grasshoppers in regions where outbreaks of this insect occur regularly as yet have not been successful. The results obtained through these investigations, however, are of great scientific value since they add a new page to our knowledge of how nature controls the ravages of insect and similar pests in certain regions.

Recent work proved the neoaplectanas, another group of nematodes, to be highly efficient disease agents of numerous economic insects. They attack the larval stages (soil phase) of such pests as the Japanese beetle, alfalfa weevil, fall army worm, spotted cutworm, house-fly larva, corn earworm, etc. Experiments are showing that these pathogenic forms may be raised in large numbers on artificial media for colonization purposes, and it is hoped that methods can be developed by which these parasites may be used as an efficient factor in the control of these pests.

#### (r) PLANT EXPLORATION AND INTRODUCTION

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$200,933      |
| Budget Estimate, 1940.....   | <u>200,933</u> |

#### PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. Plant exploration and collection.....                                 | \$53,034 | \$51,056            | \$51,056            |
| 2. Field testing of introduced plants.....                               | 128,840  | 128,969             | 128,969             |
| 3. Plant geography and bibliographic investigations.....                 | 20,805   | 20,908              | 20,908              |
| Transferred to "Dry-Land Agriculture" for regrassing investigations..... | 1,375    | - - -               | - - -               |
| Unobligated balance.....   | 429      | - - -               | - - -               |
| Total appropriation.....   | 204,483  | 200,933             | 200,933             |



## CHANGE IN LANGUAGE

It is recommended that the language of this paragraph be amended by adding at the end the following proviso:

That not to exceed \$1,400 of this amount may be expended for the purchase of approximately twenty acres of land at the U. S. Plant Introduction Garden, Glenn Dale, Maryland.

The tract referred to above abuts the Glenn Dale station on two sides. It has been rented for a number of years and the lease, which contains an option to purchase the land for \$1,400, expires with the fiscal year 1940. The owner has stated that he will not renew the lease. The land is badly needed for the work conducted at the station and can be acquired without increasing the appropriation now provided by this item.

## WORK UNDER THIS APPROPRIATION

General.--This Division serves as a cooperative and coordinating agency for securing from all parts of the world new, rare, and promising plants that may be useful in the development of new crop industries, directly for the diversification or expansion of economic needs, or as material to be used by plant breeders, especially as related to the development of disease and insect-resistant crops. Initial protection is provided against the introduction of foreign insects and diseases, and preliminary propagation and tests are conducted at four widely separated field stations. Cooperation is maintained with crop specialists in the U. S. Department of Agriculture, State agricultural colleges and experiment stations, botanic gardens, arboreta, nurserymen, and with selected lists of specially qualified private individuals. Studies are conducted of potential crop plants and of soil and climates of foreign countries as compared with this country, with a view to obtaining materials for introduction most adapted to our needs.

This Division is now generally recognized as the clearing house through which needed plant material is most effectively received. It is also recognized in this country and abroad as the most effective agency in exchanging plant material with foreign research workers, and results obtained have been so effective that its organization and procedure have been studied by other countries as a basis for the establishment of similar organizations. Introductions obtained by exploration and through contacts built up with foreign research workers, nurserymen, botanists, explorers, and plantsmen, as well as our own consular officers and commercial and agricultural attaches, have developed into important crops having a high economic value in our domestic agriculture.

1. Plant Exploration and Collection.--Foreign explorations are carried on by agricultural explorers for the purpose of receiving new and promising types of plants superior to those now grown in this country or having promise of aiding in the development of new crop industries and further advancing our agricultural and horticultural interests through breeding, development of disease-resistant crops, and meeting the changes in shifting economic needs, as well as contributing to such broad problems as erosion control, range im-



provement, and beautification of the home and its surroundings. As an adjunct to field operations, worldwide exploration work is carried on through correspondents and collaborators in foreign countries, having in view the same objects and purposes.

Since this work is carried on with a view to aiding agriculture in all parts of the country, it is widely regional. Important grain introductions include varieties of wheat, barley, rye, oats, rice, and grain sorghums which have become standard over wide areas of our grain-growing regions. Forage introductions of varieties of alfalfa, soybeans, lespedezas, grasses, and vetches include many which have become an indispensable part of our agriculture. One cotton variety, the Acala, has been developed into the single variety of importance around which the cotton industry of the Southwest largely centers. As a result of most recent explorations, potatoes, tobaccos, and a wide range of vegetables have been received for work in major breeding projects for other divisions of the Bureau of Plant Industry. While results in the field of horticulture are slower because of the long-time nature of most of the crops, certain introductions of citrus fruits, avocados, and nectarines have become commercially important crops and other introductions have been of material assistance to breeders in the development of new varieties and disease- and insect-resistant root stocks.

2. Field Testing of Introduced Plants.--Experimenters' service activities under this appropriation include the widespread regional testing of all introduced plant material, with a view to determining its adaptability to the soils and climates of this country. This is accomplished by means of organized cooperation with crop specialists of the United States Department of Agriculture, State agricultural colleges and experiment stations, botanic gardens, and arboreta, together with selected lists of nurserymen and private individuals. Similar tests and experiments are carried on at four special plant-introduction gardens so located as to receive widespread regional effects of soil and climate.

This work is an essential part of plant introduction. Before extensive cultivation of introduced plants can be advised, reliable information must be obtained concerning their adaptability and their potential value to American agriculture and horticulture. This information can be obtained only by means of widespread field tests. A vital activity of this service is to prevent the bringing in of new insect pests or diseases incident to the introduction of plant material. Special facilities for growing and propagating under quarantine and detention, under rigid control, are utilized for this purpose.

3. Plant Geography and Bibliographical Investigations.--Studies are made of the relation of crop distribution to climatic and soil conditions and of the important problems of plant introduction from a geographical point of view for the purpose of locating foreign sources of potentially valuable crops and to insure that such crops, when introduced, will be provided with soil and climatic conditions suited to their needs. This work is essential to the development of a proper and intelligent background for plant introduction and the necessary testing work connected therewith. Its purpose is to chart the field in advance so that a minimum of time and effort will be lost in the search for new crops and the proper placing of these crops for experimental use. Unless adequate plans are made in advance through this project, much of the efficiency of the introduction procedure would be lost.





## (s) PLANT NUTRITION

Appropriation Act, 1939..... \$16,024  
 Budget Estimate, 1940..... 16,024

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| Plant nutrition investigations,<br>including effects of length of<br>day on growth..... | \$15,883 | \$16,024            | \$16,024            |
| Unobligated balance.....  | 141      | - - -               | - - -               |
| Total appropriation.....  | 16,024   | 16,024              | 16,024              |

## WORK UNDER THIS APPROPRIATION

The great variation in influence of certain crops on both yield and quality of succeeding crops in the rotation system is particularly important. Plant nutrition investigations are directed toward the determination of the extent and significance of the influence of those variations, particularly on yield and quality of crops included in the rotation, and include the relative plant-food requirements of the crops in the rotation system. Laboratory and field investigations are conducted to determine which of the chemical elements are essential for normal plant growth and the functions of these elements in the nutrition of the plant, with special reference to elements required only in very small quantities. Studies are also made of the effect of length of day on growth, development, and composition of plants, including effects of the daily duration, the intensity, and the color or composition of the light. The work is carried on with the same personnel as those engaged in Tobacco Investigations.

The practical importance of the cropping system on yield and quality of crops is illustrated by recent field trials in which a weed fallow preceding tobacco has consistently more than doubled the market value of the tobacco crop in various localities, mainly because of remarkable improvement in quality of the leaf. Other crops also may be greatly affected by the rotation system. The nutrition studies are demonstrating that for many important soils it is necessary to include in the fertilizer mixtures materials which will supply certain chemical elements not previously considered, such as magnesium, calcium, sulphur, and boron. These results have an important bearing on the correct use of the new highly concentrated fertilizer materials. Discovery of the remarkable effects of seasonal and latitudinal change in length of day on the growth and the flowering and fruiting of plants is being effectively applied to the production of seed of certain varieties of tobacco under short-day

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conditions in the South, while the crop of commercial leaf is grown in northern latitudes where seed can not be produced because of the long days. The principles are now being found to largely govern the northerly or southerly range of the different varieties and strains of various crop plants. They are also finding practical application in the commercial production of certain flowers, such as chrysanthemum, several weeks in advance of their normal season by shading to shorten the day length. This method of hastening and controlling time of flowering is being extensively used in the production of new varieties of crop plants by breeding.

(t) RUBBER AND OTHER TROPICAL PLANTS

|                              |               |
|------------------------------|---------------|
| Appropriation Act, 1939..... | \$46,749      |
| Budget Estimate, 1940.....   | <u>46,749</u> |

PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. Rubber production and breeding investigations.....  | \$20,044 | \$20,049            | \$20,049            |
| 2. Miscellaneous economic tropical crop studies, including coffee, cacao, coconut, papayas, oil palms, bananas, and other minor crops of potential importance..... | 26,633   | 26,700              | 26,700              |
| Unobligated balance.....   | 72       | - - -               | - - -               |
| Total appropriation.....   | 46,749   | 46,749              | 46,749              |

WORK UNDER THIS APPROPRIATION

Under this appropriation experiments are conducted bearing on the introduction into cultivation of foreign and native plants of potential value in the production of rubber and on the acclimatization and adaptation of various tropical crop plants to the warmer regions of the United States. Studies are conducted with such crop plants as cacao and coffee. Plantings are maintained in southern Florida, and selections are made of species and strains which are found to be adapted to the warmer sections of this country. Cooperative pollination studies are in progress to provide data for the development and special propagation of high-yielding clones and experiments on methods of rubber extraction. Other plantings of nontropical and rubber-producing plants (chiefly goldenrods) are maintained in Georgia, and studies are made of native and hybrid strains for the production of rubber of this type. Investigations of tropical plants are essential to the establishment



of new crops and ornamentals in the South. Experiments and tests conducted at plant-introduction stations of the Bureau of Plant Industry have resulted in the selection of a large number of tropical plants adapted to cultivation in the South, and other plants now being tested have shown promise of being valuable additions to the South's tropical horticulture.

Rubber investigations constitute the most important phase of tests now under way. Over half of the world's output of rubber is consumed in the United States. No other commodity which is not produced in commercial quantities inside our borders is of more importance in our American life. Not only do we produce no rubber in important quantity, but the source of 90 percent of our rubber is thousands of miles away in the East Indies and might be cut off entirely either by economic manipulation or military mischance, or the price might be raised so high by restrictive combinations of producing areas as to compel us to pay a high premium to foreign investors. In case of war, our very existence might depend on assurable supplies of rubber. Also, actual or potential production of rubber in the United States would act as a curb to check foreign combinations formed to increase the cost of rubber artificially.

#### (u) SEED INVESTIGATIONS

|   |          |         |
|---|----------|---------|
| Appropriation Act, 1939.....              | \$72,293 |         |
| Allotments for transfer in 1940 Estimates |          |         |
| (incident to transfer of regulatory work  |          |         |
| under this item to "Agricultural Market-  |          |         |
| ing Service" and transfer of seed re-     |          |         |
| search to other divisions of the Bureau   |          |         |
| of Plant Industry), as follows:           |          |         |
| "Federal Seed Act", Agricul-              |          |         |
| tural Marketing Service....               | \$52,293 |         |
| "Cereal Crops and Diseases",              |          |         |
| Bureau of Plant Industry...               | 8,750    |         |
| "Forage Crops and Diseases",              |          |         |
| Bureau of Plant Industry...               | 3,450    |         |
| "Fruit and Vegetable Crops                |          |         |
| and Diseases", Bureau of                  |          |         |
| Plant Industry.....                       | 7,800    | -72,293 |
| Budget Estimate, 1940.....                | - - -    |         |





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## (v) SOIL CHEMICAL AND PHYSICAL INVESTIGATIONS

Appropriation Act, 1939 (Bureau of Chemistry and Soils).....\$76,700  
 Budget Estimate, 1940.....76,700

NOTE.--This item transferred to the Bureau of Plant Industry from the Bureau of Chemistry and Soils incident to consolidation of latter bureau with the Bureau of Agricultural Engineering to create the Bureau of Agricultural Chemistry and Engineering.

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| <u>Soil chemical and physical investigations:</u>                             |          |                     |                     |
| (a) Chemical and physical analyses and tests of soils and soil materials..... | \$14,000 | \$13,700            | \$13,700            |
| (b) Investigations of the chemical and physical properties of soils.....      | 48,281   | 48,500              | 48,500              |
| (c) Selenium investigations.....  | 14,501   | 14,500              | 14,500              |
| Unobligated balance.....  | 1,299    | - - -               | - - -               |
| Total appropriation.....  | 78,081   | 76,700              | 76,700              |

## WORK UNDER THIS APPROPRIATION

The purpose of this work is to determine in a systematic manner the detailed physical properties of important groups of soils, establish their chemical composition and distinctive chemical properties, determine their relationship to each other and to their parent material and climatic environment, and furnish this information to soil workers in different fields.

Work under this appropriation includes research on the chemical and physical properties of soil, the influence of different components, and their significance in soil classification and utilization and other phases of soil science; study of the selenium content of soils and its relation to toxicity of vegetation grown thereon; and chemical and physical analyses and tests of soils and soil materials, chiefly for the Soil Survey and other Government agencies.

Service work for the Government agencies consists of mechanical analyses and chemical determinations which are required for specific problems in soil survey, erosion control, plant industry, animal industry, buildings and grounds projects, and other problems relating to soils and soil materials.

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In the research work soil colloids - the active components of the soil - have a prominent place. A thorough knowledge of these is essential to satisfactory classification of soils for land utilization, soil conservation, and, in fact, most soil problems. Soil organic matter is being investigated, including chemical research on peat, with a direct bearing on the utilization of 110,000,000 acres of domestic peat deposits; and investigations of soil-moisture relationships and heat conductivities are under way. A special study is being made of the various quick chemical tests of soil needs and of their reliability for present agriculture.

Selenium investigations are concerned with the determination of the extent and intensity of the selenium toxicity of soils, a condition which exists in more or less acute form in widely distributed areas in the Middle West and which results in the growth of toxic vegetation responsible for certain animal diseases in the sections affected. This work is inevitably connected with other elements of minor quantity but of major importance to soil utilization, among which are copper, cobalt, boron, and fluorine.



## (w) SOIL-FERTILITY INVESTIGATIONS

Appropriation Act, 1939..... \$168,457  
 Budget Estimate, 1940..... 168,457

## PROJECT STATEMENT

| Projects   | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|---------|---------------------|---------------------|
| 1. <u>Soil-fertility investigations:</u>                                   |         |                     |                     |
| (a) Citrus soil-fertility investigations.....                              | \$9,500 | \$8,900             | \$8,900             |
| (b) Pecan soil-fertility investigations.....                               | 13,550  | 19,300              | 19,300              |
| (c) Cotton soil-fertility investigations.....                              | 6,850   | 6,700               | 6,700               |
| (d) Potato soil-fertility investigations.....                              | 9,250   | 8,700               | 8,700               |
| (e) Sugarcane soil-fertility investigations.....                           | 12,625  | 13,100              | 13,100              |
| (f) Sugar beet soil-fertility investigations.....                          | 10,525  | 11,200              | 11,200              |
| (g) Soil-fertility investigations on truck and miscellaneous crops.....    | 9,800   | 9,750               | 9,750               |
| (h) Soil improvement by crops and cropping methods, Investigations of..... | 8,455   | 7,807               | 7,807               |
| (i) Biochemical soil-fertility investigations.....                         | 49,870  | 46,835              | 46,835              |
| (j) Cotton root-rot soil and fertilizer investigations.....                | 34,455  | 36,165              | 36,165              |
| Transferred to "Dry-Land Agriculture" for regrassing investigations.....   | 1,000   | - - -               | - - -               |
| Unobligated balance.....   | 277     | - - -               | - - -               |
| Total appropriation.....   | 172,157 | 168,457             | 168,457             |

## WORK UNDER THIS APPROPRIATION

Work under this appropriation consists of studies of soil fertility and fertilizer problems to develop economical practices which will enable the farmer to reduce his cost of production and obtain crops of better quality. The work involves determining the fertilizer requirements of different soil types for different crops and the influence of fertilizer elements on the growth, maturity, yield, quality, and disease resistance of crops; biochemical soil and fertilizer studies on the relation of organic matter, green manure,

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Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher than the number of incorrect responses in all cases.

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<sup>a</sup>  $\chi^2 = 0.76$ ,  $p = .82$ . <sup>b</sup>  $\chi^2 = 0.92$ ,  $p = .63$ . <sup>c</sup>  $\chi^2 = 0.00$ ,  $p = 1.00$ .

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and crop residues to soil fertility; cotton root-rot soil and fertilizer studies; and soil-improvement investigations in the sandhill section of the South. Knowledge of inherent soil fertility and the relative adaptability of specific soil types to specific crops and knowledge of the particular fertilizer required to supplement natural soil fertility for certain crops are important factors in reducing cost of crop production. Moreover, every acre of crop soil is subject to depreciation and decreased efficiency if proper methods of soil fertility maintenance are not followed--a factor in conservation of invested capital as well as in cost of production.

Many new phosphatic materials are being produced from raw rock phosphate and available information is meager and contradictory concerning the nutrient value for crops. Important Government agencies, including the T. V. A., are concerned with the production of such material, including calcium meta phosphate, potassium meta phosphate, mono calcium chlorophosphate, dicalcium phosphate, calcined phosphate, fused phosphate, treble superphosphate containing both calcium and magnesium, and other carriers in which T. V. A. is interested and must know what agronomic value these materials possess in order to regulate a production program. The Agricultural Adjustment Administration has also asked for assistance in determining the value of different phosphate in connection with its soil conservation program with cover crops in various regions. Many phosphate materials are being exploited to the public through misrepresentation. One of the purposes of this investigation, therefore, is to definitely determine the agronomic facts as to their efficacy under different climatic and soil conditions.

Under this project the fertilizer requirements of the principal soil types and agricultural regions are being determined for a number of important crops, including sugarcane, sugar beets, potatoes, truck crops, citrus and other subtropical fruits, pecans, green-manure crops, and cotton, including for the latter crop the effect of these fertilizer factors on cotton root-rot. Field and laboratory studies are prosecuted to determine the influence of fertilizers and soil characteristics, correlating these with the prevalence of diseases and nutritional disturbances. The most suitable fertilizer ratios, the most desirable kind and amount of each fertilizer ingredient to use, and the most economical rate of application are determined. The economic value of using more concentrated fertilizer in crop production and the placement of fertilizer to secure maximum results in stand and yield are investigated under practical farm conditions. The work involves the establishment of field experiments on prominent soil types in cooperation with State experiment stations and leading farmers. Biochemical soil and fertilizer studies are made on the nature, quantity, and distribution of organic compounds in soils and their effect on biological activity, on the changes brought about in soil constituents by growing plants, and on changes which fertilizer salts undergo in soils and their effects on plants, which researches are of fundamental importance in developing sound fertilizer usage. Soil-fertility investigations are designed to enable the farmer, with the least possible outlay, to obtain the greatest net return for his work through reduction of unit cost and meeting the demands for better quality products.



## (x) SOIL MICROBIOLOGY INVESTIGATIONS

Appropriation Act, 1939..... \$39,854  
 Budget Estimate, 1940..... 39,854

## PROJECT STATEMENT

| Projects  | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|----------|---------------------|---------------------|
| 1. Soil inoculation investigations and inspection of cultures.....  | \$19,000 | \$19,000            | \$19,000            |
| 2. Soil population investigations in relation to crop production, bearing primarily on fungi, bacteria, algae, etc..... | 20,182   | 20,854              | 20,854              |
| Unobligated balance.....  | 672      | - - -               | - - -               |
| Total appropriation.....  | 39,854   | 39,854              | 39,854              |

## WORK UNDER THIS APPROPRIATION

General.--The purpose of this appropriation is to inspect and test commercial cultures of legume nodule bacteria, including researches upon legume inoculation, and to investigate microorganisms in the soil, their activities, and relationships to crop production.

1. Soil Inoculation Investigations and Inspection of Cultures.--Work under this project includes inspection and testing of commercial cultures of legume nodule bacteria and of soil inoculants to insure that cultures sold to farmers are true to type, viable, and efficient for the purpose claimed. Research is also conducted on legume nodule bacteria in connection with the efficiency of strains, influences which alter their quality or interfere with their functions, methods of practical application, and the development of special strains for all legume crops, including those newly introduced into this country. Since the proper nitrogen-fixing bacteria must be applied to legume seed wherever the growing of a particular crop is extended into a new area, a tested collection of strains is maintained to aid in the establishment of new crops in cooperation with State experiment stations, county agents, and individual farmers.

2. Soil Population Investigations in Relation to Crop Production, Bearing Primarily on Fungi, Bacteria, Algae, etc.--Work on this project covers studies on the decomposition of cellulose and crop residues; the effect of soil reactions and soil treatments on the microorganisms and their activity in the soil; studies of the organisms responsible for the decay of soil organic matter; and studies on the slime molds and their functions in soil. These in-



vestigations are planned to obtain a better understanding of the nitrogen transformation and economy of the soil and the relation of its micropopulation to different manuring, cropping systems, and other treatments, with the view to increasing the efficiency of farm practices.

(y) SOIL SURVEY

Appropriation Act, 1939 (Bureau of Chemistry and Soils) .....\$298,708  
 Budget Estimate, 1940..... 298,708

PROJECT STATEMENT

| Projects  | 1938      | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|-----------|---------------------|---------------------|
| 1. Investigations, classification and mapping of soils in the field.....            | \$212,513 | (a)\$213,170        | \$213,170           |
| 2. Field inspection of soil surveys and correlation of soil types and series.....   | 32,788    | 32,788              | 32,788              |
| 3. Adjusting, constructing, and drafting soil maps and charts for reproduction..... | 50,750    | 52,750              | 52,750              |
| Unobligated balance.....  | 5,157     | - - -               | - - -               |
| Total appropriation.....  | 301,208   | (a) 298,708         | 298,708             |

(a) Includes \$200 transferred to Bureau of Standards, Department of Commerce for research on photographic work.

WORK UNDER THIS APPROPRIATION

The object of the Soil Survey is to classify and map soils of the United States and to describe their characteristics, particularly in reference to the growth of various crops, grasses, and trees. The ultimate purpose is to provide accurate soil maps of the country necessary for the classification of rural lands and for the factual basis in the development of any rational program of land use, whether by public agencies or the individual farmer. The work comprises the determination of the character of soils, the definition of soil types, development of a uniform system of classification for the Nation, delineation upon maps of the boundaries of each type, the correlation of the various soil types in the country, and the interpretation of their relationship to the production of crops, grasses, and trees. This information is made available in published form to those interested in all phases of agriculture and other problems of land use.





State cooperating agencies and other public organizations are furnished advance photographic copies of the field work for their immediate use where needed at once. Essentially all the work is accomplished in financial co-operation with the various States and is necessary to them for the development of programs for the readjustment of their agriculture on a sound basis. For the past several years special reports and surveys have been made for various other Governmental agencies which have need for physical data regarding land in order to develop the programs which are under their responsibility.

### SUPPLEMENTAL FUNDS

#### Direct Allotments

| Projects  | Obligated,<br>1938 | Estimated<br>obligations,<br>1939 | Estimated<br>obligations,<br>1940 |
|---|--------------------|-----------------------------------|-----------------------------------|
| <u>Agricultural Adjustment Administration:</u><br><u>(Payments for Agricultural Adjust-</u><br><u>ment), Bureau of Chemistry and Soils:</u><br><u>(Bureau of Plant Industry); For</u><br><u>soil surveys in Puerto Rico.....</u>  | \$42               | - - -                             | - - -                             |
| <u>Working Fund, Agriculture (Salaries</u><br><u>and Expenses, Farm Credit Adminis-</u><br><u>tration), Bureau of Chemistry and</u><br><u>Soils (Bureau of Plant Industry):</u><br><u>For soil surveys in Shenandoah</u><br><u>Valley sections of Virginia and West</u><br><u>Virginia.....</u> | 1,600              | - - -                             | - - -                             |
| Total, Supplemental Funds<br>(Direct Allotments).....   | 1,642              | - - -                             | - - -                             |



## (z) SUGAR-PLANT INVESTIGATIONS

|                              |                |
|------------------------------|----------------|
| Appropriation Act, 1939..... | \$322,500      |
| Budget Estimate, 1940.....   | <u>322,500</u> |

## PROJECT STATEMENT

| Projects   | 1938     | 1939<br>(Estimated) | 1940<br>(Estimated) |
|--|----------|---------------------|---------------------|
| 1. <u>Sugar beet investigations:</u>   |          |                     |                     |
| (a) Sugar-beet leaf-spot and root-rot control investigations.....                                | \$34,600 | \$33,713            | \$33,713            |
| (b) Sugar-beet curly-top control investigations, including breeding and other means.....         | 97,314   | 96,063              | 96,063              |
| (c) Sugar-beet production and breeding investigations.....                                       | 75,818   | 75,018              | 75,018              |
| Total, Sugar beet investigations.....  | 207,732  | 204,794             | 204,794             |
| 2. <u>Sugarcane investigations:</u>  |          |                     |                     |
| (a) Sugarcane cultural investigations.....   | 31,595   | 30,535              | 30,535              |
| (b) Sugarcane disease investigations.....  | 31,277   | 30,917              | 30,917              |
| (c) Sugarcane breeding investigations.....   | 49,147   | 49,118              | 49,118              |
| (d) Sugarcane deterioration in storage, Investigations of.....                                   | 7,352    | 7,136               | 7,136               |
| (e) Purchase of land and construction and equipment of sugar laboratory at Houma, Louisiana..... | 98,513   | - - -               | - - -               |
| Total, Sugarcane investigations..  | 217,884  | 117,706             | 117,706             |
| Transferred to "Dry-Land Agriculture" for regrassing investigations.....                         | 2,000    | - - -               | - - -               |
| Unobligated balance.....   | 1,084    | - - -               | - - -               |
| Total appropriation.....   | 428,700  | 322,500             | 322,500             |



# WORK UNDER THIS APPROPRIATION

General.--The work under this appropriation consists chiefly of research on the problems connected with the growing of sugar beets, the production of sugar-beet seed, and the growing of sugarcane in continental United States, including the control of diseases affecting these crops. The purpose of the work is to safeguard the sugar-beet and sugarcane industries against losses resulting from diseases and from other controllable hazards and, by breeding and introducing disease-resistant varieties of sugar beets and sugarcane, by developing other means for the control of diseases, and by solving other agricultural problems of the industries, to stabilize production and, by insuring fairly definite yield expectations regardless of disease-inducing weather variations, to further increase the level of profitability of producing these crops. Results of research pertaining to sugarcane are also of important value to the sugarcane industry of Puerto Rico, Hawaii, and the Virgin Islands.

1. Sugar-Beet Investigations.--Under this project superior varieties of sugar beet are being developed by application of modern methods of plant breeding, the aim being to secure types better adapted to the conditions of the respective sugar-beet districts. In this research adapted types are selected and increased. Through continued selection and inbreeding, stabilized strains are being developed for production of desirable  $F_1$  hybrids for use by growers. Agronomic experiments are conducted to evaluate varieties and to improve cultural practices. Special investigations on the nature and control of curly top, leaf spot, and root rot are conducted. In cooperation with the Bureau of Entomology and Plant Quarantine, general control measures for the beet leaf hopper, the insect vector of curly top, are being studied. The sugar-beet industry is particularly interested in the investigations of improved field methods for sugar-beet production, the prevention of disease losses, and in the increase of seed supplies of improved and disease-resistant varieties.

Sugar production from beets in continental United States has been stabilized by the Sugar Act of 1937. More than 800,000 acres in twenty States (Michigan, Ohio, Indiana, Wisconsin, Illinois, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Washington, Oregon, and California) were planted in 1937 to sugar beets, and in the great majority of these the sugar beet has an important place in the cropping system. In Texas, New Mexico, Utah, California, Arizona, Nevada, and Oregon sugar-beet seed production also has become an important, intensive agricultural enterprise utilizing in 1937 about 7,000 acres.

The capital investment in farm lands, farm equipment, irrigation systems, factories, factory equipment, and transportation and power facilities directly concerned in sugar-beet production and beet-sugar manufacture may be conservatively placed at \$350,000,000. The capital investment in important subsidiary industries furnishing supplies and services to the beet industry and in the livestock industry directly concerned in utilizing sugar-beet by-products as feed would greatly increase this figure. For the 1937 crop the fabricated products--beet pulp, molasses, and refined sugar--had a value of nearly \$100,000,000 and the sugar beets were worth on the farm \$52,107,000, the beet tops having an estimated field value of more than \$5,000,000. The sugar-beet seed produced was worth, on the farm, more than \$1,000,000.





The sugar beet in good years returned a profit to the farmer. It should be even more favorably considered when benefit payments, provided by the Sugar Act of 1937, are taken into account. Because of ravages of disease, improper cropping practices, and soil depletion, however, the crop has been an extremely hazardous one in many districts. With increasing costs of production, taking into account the relatively narrow margin of profit of the average producer, factors making for depressed yields take on added significance. A truly stabilized and safe sugar-beet agriculture can be secured only when the enormous losses to farmer and factory, arising from disease epidemics and because of inefficient crop practices, are removed as a result of agricultural research.

Gratifying progress in the development of strains of sugar beet resistant to curly top and leaf spot (two important diseases of the sugar beet) has been made. Varieties showing progressive increase in curly-top resistance have been released by the Bureau of Plant Industry since 1935, namely, U. S. 1, U. S. 34, U. S. 33, and, in 1937, U. S. 12. In some States in the curly-top area, these varieties have been used almost exclusively and have greatly reduced, but not eliminated, curly-top losses. In 1938 approximately 60 percent of the acreage in the curly-top area will be planted with curly-top-resistant sorts. Lack of specific adaptation to certain localities of the varieties so far developed is chiefly responsible for the failure of the new varieties to replace European brands entirely. Several varieties markedly improved in resistance to the serious disease, leaf spot, are being used on a considerable acreage in 1938 east of the Rocky Mountains where this disease is prevalent. Strains of greater promise because of their resistance to either curly-top or leaf spot, are in process of development and test, forecasting the eventual removal of these disease hazards, which cause a loss of many millions every year to farmer and factory.

The success of producing the curly-top-resistant varieties and the progress in securing leaf-spot-resistant types have brought into existence a new industry for American farmers--domestic production of sugar-beet seed. This enterprise, growing out of research carried on under this appropriation, began on a substantial basis in 1933 and has increased each year. In 1937, on approximately 7,000 acres in the seven States listed above, more than 12,000,000 pounds of seed were produced, supplying about 70 percent of the 1938 seed requirement. This seed enterprise, if research be actively continued to develop adapted varieties, will free American farmers from the anomalous and traditional dependence upon Europe for sugar-beet seed, a situation which is uneconomical from many points of view and which would be of serious consequence should war or other cause interfere with an imported seed supply. (The California, Arizona, Idaho, New Mexico, Colorado, Texas, Minnesota, Tennessee, Missouri, Ohio, and Michigan Agricultural Experiment Stations; the Division of Soil Fertility Investigations of the Bureau of Plant Industry; and the Division of Carbohydrate Research and Division of Mechanical Equipment of the Bureau of Agricultural Chemistry and Engineering are cooperating in the work under this project.)

Field stations and laboratories are maintained at the following points; Twin Falls, Idaho; Riverside, Calif.; Fort Collins, Colo.; Salt Lake City, Utah; and Rocky Ford, Colo. Field experiments, largely cooperative, are



conducted at Davis, Calif.; Logandale, Nev.; Las Cruces, N. Mex.; Denton and Lubbock, Texas; Scottsbluff, Neb.; St. Paul, Minn.; Sikeston, Mo.; Knoxville, Tenn.; Holgate, Ohio; East Lansing, Mich.; and Arlington, Va.

2. Sugarcane Investigations.--These investigations include the study of sugarcane diseases, development of disease control methods, and the breeding and testing of new varieties of cane to secure disease-resistant, higher-yielding commercial varieties better adapted to natural climatic and soil conditions. The sugarcane industry is particularly interested in the investigations on field methods of controlling diseases, the continued development of disease-resistant varieties looking toward minimizing the fluctuations in production due to recurring disease hazards, and in the increase and distribution of seed supplies of the improved varieties as they are developed.

It is recognized that increased efficiency in sugar production depends upon a number of factors but mainly upon improvement of the sugarcane plant itself. The sugarcane research projects represent an attempt to keep as close step as possible with general advances in plant improvement by adaptation to the special and limiting characteristics of the plant - the technique of the modern plant geneticist. The projects are built around a main project of improvement of the varieties of sugarcane to meet the needs of cane producers in various American producing areas with different conditions and different sets of problems. Climatic, soil, and disease problems are being studied and evaluated biologically to determine rational limits of improvement by the use of available germ plasm. World-wide collections of the wild and cultivated forms of *Saccharum* and related genera constitute the source of material. From many parts of the tropical and temperate zones plants having a wide range of characteristics have been assembled and further collections are being made to determine as far as possible the full range of natural variation within the species. The reference collections of cane varieties, after passage through a rigid quarantine procedure at Arlington Farm, are assembled at breeding stations located geographically with the view of synchronizing the blooming of short and long-day varieties at points where interchange of pollen or other germ plasm between stations may be made rapidly by air transport. The Eastern United States, Central America, and the west coast of South America provide locations at suitable intervals of latitude for this work.

The project directly serves cane producers in eight States and Puerto Rico, who utilize about 490,000 acres of land for sugar production and more than 100,000 acres for sirup production. The welfare of approximately 1,000,000 people living in these cane-producing areas is directly or indirectly dependent upon the crop. About \$330,000,000 are invested in land, transportation and milling equipment, implements, etc. Incidental service features of the activities in this project are extended to the sugar industry of the Territory of Hawaii, which has capital investments of about \$175,000,000. Outstanding progress has resulted from this work, the most striking example being the reconstitution of the Louisiana sugarcane industry by means of disease-resistant varieties of cane. The five-year average production of sugar reflecting the per acre yield of cane during the period 1924-28 dropped because of a recently introduced virus disease to 95,400 tons per year, compared with an average of 280,000 tons for the previous 20 years and a maximum in any one year of nearly 400,000 tons. Restoration to an average of 312,000 tons per year for



the period 1933-37, which approaches the best previous five-year period, is directly attributable to this research, and, given reasonable encouragement and protection, the outlook for complete restoration and effective safeguarding of this important industry and of the cane-sirup industry in the Southern States in which sugarcane is grown seems dependent only on intensive prosecution of work under this appropriation. Farm value in 1937 of sugarcane grown for sugar production and of cane sirup produced in Louisiana alone was in excess of \$21,000,000. (The Puerto Rico, Louisiana, and Mississippi Agricultural Experiment Stations are cooperating in this work).

Field stations and laboratories are maintained at Canal Point, Fla., Houma, La., Cairo, Ga., Meridian, Miss., and Arlington Farm, Virginia.

(aa) TOBACCO INVESTIGATIONS

Appropriation Act, 1939.....\$135,544  
Budget Estimate, 1940..... 135,544

PROJECT STATEMENT

| Projects  | 1938    | 1939<br>(Estimated) | 1940<br>(Estimated) |
|---|---------|---------------------|---------------------|
| <u>Tobacco investigations:</u>  |         |                     |                     |
| (a) Cigar binder and filler production investigations.....                  | \$5,235 | \$5,717             | \$5,717             |
| (b) Flue-cured tobacco production investigations.....                       | 25,659  | 28,312              | 28,312              |
| (c) Burley tobacco production investigations.....                           | 8,688   | 9,235               | 9,235               |
| (d) Maryland tobacco production investigations.....                         | 6,225   | 6,560               | 6,560               |
| (e) Dark air-cured tobacco production investigations.....                   | 2,230   | 2,400               | 2,400               |
| (f) Tobacco disease investigations.....                                     | 52,590  | 51,402              | 51,402              |
| (g) Breeding and growing high nicotine tobacco for use in insecticides..... | 11,014  | 10,050              | 10,050              |
| (h) Tobacco breeding and physiological investigations.....                  | 23,515  | 22,068              | 22,068              |
| Transferred to "Dry-Land Agriculture" for regrassing investigations.....    | 825     | - - -               | - - -               |
| Unobligated balance.....  | 1,763   | - - -               | - - -               |
| Total appropriation.....  | 137,744 | 135,544             | 135,544             |







## WORK UNDER THIS APPROPRIATION

Tobacco investigations include all phases of growing, curing, and handling tobacco, with the exception of tobacco insects and their control and tobacco marketing. The work consists of studies on tobacco diseases and their control, laboratory research on causes of poor quality in leaf tobacco, and field investigations in the improvement of tobacco varieties and methods of fertilization, growing, curing, and handling the different types of leaf, as each distinctive type of tobacco presents special cultural problems. Development by breeding of milder types of leaf having a reduced content of nicotine is a feature of the work, as are also the development of high-nicotine tobaccos for use as raw material in the production of insecticide and the determination of the best cultural methods for maximum production of nicotine. The primary aims are to increase the average quality of the tobacco produced and to reduce the hazards and heavy losses encountered in the culture of the crop. Cooperative experiments are carried on at the agricultural experiment stations of tobacco-growing States, namely, Connecticut, Georgia, Maryland, Massachusetts, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin, but no independent field stations are maintained.

Correct methods of fertilization are of outstanding importance in producing high-quality tobacco, and recent changes and trends in the production and use of fertilizer materials have created urgent need for information as to the adequacy and limitations of the newer materials in the fertilization of the different types of tobacco. Results already obtained concerning the necessity for supplementing the highly concentrated fertilizer materials with magnesium and certain other elements have strongly emphasized the importance of these problems, and the necessary information can be obtained only through extensive field and laboratory studies. It is essential also that cropping systems best suited to the production of leaf of high quality be determined. Due to the appearance of new diseases and the spread of older troubles, tobacco growers are suffering steadily increasing losses. The new blue mould or downy mildew constitutes a grave hazard over the greater portion of the tobacco-producing area, and, while much progress has been made in the development of control measures, further work is required, particularly on spray and gas treatments. In the Burley areas, in which 500,000 acres of tobacco are grown, most growers suffer damage from the black root-rot disease. In recent years hundreds of acres of tobacco in Pennsylvania have been practically ruined by the wildfire disease. Mosaic disease is widely prevalent in Maryland and other producing areas. Although definite progress has been made in developing control measures, much additional work is required, especially on some of the newer disease problems. Increase in the available supply of nicotine for insecticidal purposes at reasonable cost appears to be a matter of special importance at the present time, especially in connection with the spray-residue problem. There is urgent need for improvement in present methods of curing to eliminate serious losses incurred with Burley and other air-cured types.



## (bb) WESTERN IRRIGATION AGRICULTURE

(This item is superseded by "Irrigation Agriculture" and merged thereunder with a part of the appropriation "Agricultural Engineering Investigations", Bureau of Agricultural Engineering. See "Irrigation Agriculture", Bureau of Plant Industry).

## (cc) TOTAL, BUREAU OF PLANT INDUSTRY

Change in Language

It is recommended that the language of this paragraph be amended by substituting for the word "Total" the following:

"In all, salaries and expenses, to be accounted for as one fund"

For explanation of this change see general note in these Justifications under Office of Experiment Stations, page 54.



## SUPPLEMENTAL FUNDS

(Complete bureau statement)

| Projects  | Obligated,<br>1938 | Estimated<br>obligations,<br>1939 | Estimated<br>obligations,<br>1940 |
|---|--------------------|-----------------------------------|-----------------------------------|
| <u>Special Research Fund, Department of Agriculture:</u>  |                    |                                   |                                   |
| Special research projects.....  | \$101,539          | \$119,750                         | \$97,800                          |
| Special research laboratories in<br>major agricultural regions.....   | 206,013            | 207,800                           | 246,300                           |
| Total, Special Research Fund..  | 307,552            | 327,550                           | 344,100                           |
| <u>Conservation and Use of Agricultural<br/>Land Resources, Department of Agriculture (New uses and markets for<br/>farm commodities, regional laboratories and surveys): Assistance in<br/>survey to determine location of<br/>regional research laboratories<br/>authorized by Sec. 202 of Agricultural<br/>Adjustment Act of 1938.....</u> | - - -              | 10,000                            | - - -                             |
| <u>National Industrial Recovery Act:</u>  |                    |                                   |                                   |
| Construction of artesian well,<br>South Dakota, and the completion of<br>a water system.....  | 2,366              | - - -                             | - - -                             |
| <u>Special and Technical Investigations,<br/>International Joint Commission,<br/>United States and Great Britain<br/>(State Transfer to Agriculture):<br/>For smelter-fumes investigations...</u>   | 3,767              | - - -                             | - - -                             |
| <u>Agricultural Adjustment Administration<br/>(Payments for Agricultural Adjustment): For soil surveys in Puerto<br/>Rico.....</u>  | 42                 | - - -                             | - - -                             |
| <u>Working Fund, Agriculture (Salaries<br/>and Expenses, Farm Credit Administration): For soil surveys in<br/>Shenandoah Valley sections of<br/>Virginia and West Virginia.....</u>   | 1,600              | - - -                             | - - -                             |
| Total, Supplemental Funds....   | 315,327            | 337,550                           | 344,100                           |





## PASSENGER-CARRYING VEHICLES

The work of the Bureau of Plant Industry is necessarily, to a very large extent, in the country where transportation through the use of automobiles is essential to effective work. The authorization for the purchase of passenger-carrying vehicles for the Bureau of Plant Industry contemplates an increase of \$6,775 (\$14,550 in 1939, \$21,325 estimated for 1940). The estimate for 1940 will permit the needed replacement of 33 vehicles at an average of \$578 each when exchange allowances are taken into account, and the purchase of 4 additional vehicles at an average cost of \$575. These new cars are needed to carry on increased activities under projects already under way, as follows:

COTTON AND OTHER FIBER CROPS AND DISEASES -- 1

This car to be used at Tifton, Ga., by agent and seasonal employees in conducting cooperative Sea Island cotton investigations.

IRRIGATION AGRICULTURE -- 1

1 car to be used by engineer in making inspection trips between Beltsville, Md., and points in Maryland, Virginia, North Carolina, and Delaware.

SOIL SURVEY -- 3

1 car to be used by assistant inspector in the supervision and inspection of soil survey field work in the States of Texas, Oklahoma, Missouri, Kansas, Arkansas, Louisiana, and New Mexico.

1 car to be used by assistant inspector in the supervision and inspection of soil survey field work in California, Oregon, Washington, Idaho, Nevada, Utah, Arizona, and New Mexico.

1 car to be used by assistant inspector in the supervision and inspection of soil survey field work in New York, New Jersey, Pennsylvania, Ohio, Kentucky, Indiana, Illinois, Michigan, Wisconsin, and Minnesota, as well as intervening States.















